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VETERINARY MEDICINE

September, 1934

INTERNATIONAL VETERINARY CONGRESS

SOUVENIR NUMBER

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Dates and Places of

INTERNATIONAL VETERINARY CONGRESSES

1863 First International Veterinary Congress, Hamburg, Germany
1865, Second International Veterinary Congress, Vienna, Austria
1867, Third International Veterinary Congress, Zurich, Switzerland
1883, Fourth International Veterinary Congress, Brussels, Belgium
1889, Fifth International Veterinary Congress, Paris, France
1895, Sixth International Veterinary Congress, Berne, Switzerland
1899, Seventh International Veterinary Congress, Baden-Baden, Germany
1905, Eighth International Veterinary Congress, Budapest, Hungary
1909, Ninth International Veterinary Congress, The Hague, Holland
1914, Tenth International Veterinary Congress, London, England
1930, Eleventh International Veterinary Congress, London, England
1934, TWELFTH INTERNATIONAL VETERINARY CONGRESS, NEW YORK, UNITED STATES OF AMERICA

VOL. XXIX
No. 9

75 E. Wacker Drive,
Chicago, U. S. A.

Junior FORT DODGE BIO-CHEMIC REVIEW

SEPTEMBER 1934

SUMMERTIME TORTURE

● No, these two old mares are not overly affectionate. They are simply defending themselves against throat bot fly torment.

START PARASITE PROJECTS NOW

● Instead of grazing contentedly, horses and mules in thousands of pastures have spent the summer like the two in the picture at the left—fighting bot flies.

Midsummer and early fall is the time for veterinarians to interest farmers in co-operative campaigns against these equine parasites.

Community and county-wide projects, well-planned and properly directed, offer three-way benefits:

The farmers get healthy, ascarid - free animals. The veterinarians increase their practice. And the botbe-gnawn equines secure welcome relief.

TO HELP BUILD FALL PRACTICE

● SWINE—For worming fall pigs you will need Fort Dodge Chenopodium Capsules, the capsules that contain a "double dose" of oil of chenopodium.

HORSES—In the convalescent stages of equine distemper, pneumonia and influenza, there is no substitute for Equine Tonic Elixir (Fort Dodge).

POULTRY—Before the cold-weather laying season starts, vaccinate both pullets and "holdover" hens with Fowl Pox Vaccine (Fort Dodge).

CATTLE—The ideal blackleg preventive: Blackleg Bacterin (Fort Dodge). Efficient, safe.

SHEEP—Summer lambs go into autumn loaded with stomach worms. Treat with Liquid Anthelmintic for Sheep (Fort Dodge), follow up with Veterinary Powder (Fort Dodge).

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Veterinary Medicine

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VOL. XXIX SEPTEMBER, 1934 No. 9

Published Monthly by the Veterinary Magazine Corporation
75 East Wacker Drive, Chicago, Ill., U. S. A.
$4.00 a Year

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of Mar. 3, 1879.
Entered as second-class matter under the title of American Journal of Veterinary Medicine, July 19, 1910 at Chicago, Illinois, under Act of March 3, 1879.
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D. M. Campbell, Editor A. T. Kinsley, Associate Editor
H. J. Mostyn, R.K.O. Bldg., New York, Eastern Representative

NRA MEMBER U.S. WE DO OUR PART

Achievements of International Veterinary Congresses

The outstanding veterinary convention of the year and doubtless for many years to come, is of course, the 12th International Veterinary Congress, which will be in session when this reaches our readers. In congress style we extend a welcome in the four official languages of the Congress to those who attend from other lands. To visitors from Japan, Russia and all other countries, not readily included in the four official language groups, the welcome is no less sincere. The writer is indebted to Drs. F. Volkmar and L. A. Merillat for the German and French versions of the welcome. The greeting is not only from ourselves, but from our readers and from all veterinarians of this country for whom this magazine may reasonably speak. We all appreciate the importance of the International Veterinary Congress. To it this issue of VETERINARY MEDICINE is dedicated.

When the First International Veterinary Congress was held in 1863, numerous animal plagues were rife in most civilized countries. That and all succeeding Congresses have devoted their efforts largely to the formulation of plans for the control of animal diseases. These efforts have met with such conspicuous success that now but few of the animal plagues of the last century are known to the agriculturist.

From time immemorial to within the last hundred years, obtaining sufficient food was the chief concern of the overwhelming majority of mankind. Because of animal plagues, the stockraiser was severely handicapped in the production of food. He could barely maintain the smaller population of those days on the borderline of an adequate ration. There could be little accumulation of surplus, because an accumulation of animals the more surely invited disease. An interruption of the food supply for even a single season resulted in famine and pestilence. These calamities frequently followed recurrent waves of animal plagues.

It was only when the agriculturist was freed from the menace of animal plagues that the interchange of breeding animals could take place, and the improvement of blood lines could be worked out, which has resulted in the vast improve-

ment of animal breeds of the present, the early maturity, large production, great size and economical utilization of feed.

The present security of the people in their animal food supply has been made possible, fundamentally, by the control of animal disease. To a large extent the methods by which this has been accomplished have been developed at meetings of the International Veterinary Congress.

NEW YORK SKYLINE

This marvelous view of the lower end of Manhattan Island confronts the visitor entering New York harbor.

To Our Visitors from the British Empire and from the Scandinavian Countries:

You are our guests. We feel honored that such is the case. It is our sincere wish that your sojourn with us may be filled with pleasure; that you will attain the full measure of those objectives for which you journeyed to our shore; that in the years to come you will delight to live over again in memory, your pilgrimage to the 12th International Veterinary Congress, your experiences in America, and that you will ever cherish the friendships you make while here. It is our earnest desire that you will feel kindly towards us, always, and we urge you to let us know in what ways we may contribute to your happiness and your information while here; we are at your service.

The veterinary profession of this country has derived much from you, for which we are deeply grateful. We recall the many text books from your pens and the pens of those who preceded you, that were an inspiration in our school days and are our counselors still—Strangeways', W. Williams', Finlay Dun's, Hoare's, McFadyean's, Hobday's, Bradley's, Jensen's, Sven-Wall's, to mention only a few; nor can we forget, nor have we any desire to forget, the services of your compatriots Smith, McEachran, Law, Lyman, Osgood, Preston and Dalrymple, pioneers in the founding of veterinary education and the veterinary profession on this continent. We are mindful that without the contributions of all these and of Schmidt of Kolding, Bang, Theiler and many others of your countrymen, we should have rendered our live stock industry a less valuable service and suffered in reputation. Thus, our welcome is cordial, not a lip service, but an outgrowth of appreciation of yourselves and of the veterinary profession of your lands.

We trust we overstep not the bounds of modesty nor violate the privileges of host, if we point out, in some measure, the uses we have made of the information and leadership received from branches of the veterinary profession much older than our own. Fifty agricultural experiment stations are in operation in this country, at which veterinary research is conducted. The matters under investigation are largely local, but it is thought the contributions to veterinary

science that have been made by the animal pathology department of the Rockefeller Institute for Medical Research and the exchange fellowships for veterinary students; the research of Ransom and Hall into the life histories of helminths and of means of preventing and treating of helminthiasis of animals; the work of Schroeder and Cotton, with the Bang organisms; the outstanding achievement of Dorset and associates in the field of hog cholera and the remarkable discovery of Curtice and Kilborne and Smith in the matter of insect-borne diseases has in some measure repaid our debt to older branches of the profession.

We are equally gratified that some of our contributions to public health and large projects of animal disease control, prevention and eradication have been of value to all the world. Our Federal meat inspection service comprises a careful professional examination of 75,000,000 animals yearly, affording complete supervision of these animals from the time they reach the central markets, before and at slaughter, during processing and shipment, till they enter the channels of retail trade. Approximately 1,000 veterinarians give their whole time to this work. We shall appreciate your inspection of this public health service at Chicago immediately following the Congress.

We believe, too, our success in barring foreign animal plagues from our herds and flocks may afford examples of procedure of general usefulness and we particularly invite your attention while here to our national bovine tuberculosis eradication project. We think this has been much misunderstood elsewhere. It seems to have been assumed that because the average tuberculous infection of cattle in this country was but about four per cent when tuberculosis eradication was undertaken, that our problem was relatively simple and did not present the complexities and difficulties a similar project would present in an European nation where the average of tuberculous infection was, and is, approximately ten times as high. It seems to have been overlooked that the four per cent average infection included the vast

The Capitol at Washington

herds on the ranges of the west and the cattle of the southern states, in both of which sections infection was comparatively almost non-existent. In the intensive dairy sections of the east and of the north central states (an area comparable in size and cattle population to the larger nations of Europe), the degree of tuberculosis infection among the dairy cattle ten years ago was comparable to the infection in like intensive dairy sections of Europe and it is precisely in these highly infected districts that the major portion of the eradication work has been done and in which it has met the greatest success, attained the highest popular favor and been most profitable. Whole states in these highly infected areas have been freed from the disease, or its incidence reduced to the near vanishing point.

This work, mainly in the highly infected districts, has reduced by two-thirds the average infection for the whole country and is progressing rapidly at the present time. There may be numerous reasons why the "American plan" of bovine tuberculosis eradication is neither feasible nor practicable in other countries, but the degree of infection is not one of them, nor is the cost of the plan, since the greater the percentage of infection, the more profitable becomes eradication. This plan has stood the test in large areas, varying in degree of infection from less than one-half of one per cent to more than sixty per cent. Having experienced the advantages of extirpating bovine tuberculosis we prefer them to control measures.

While you are here, we hope that you may learn something of our land beyond tidewater. None who lives in New York City will consent to it being called typical of the United States, and there is no one of the rest of us but would resent it being so regarded. Ours is a broad land of many patterns. None can presume to have a conception of it who has not viewed the stately edifices of Washington and seen at close hand the industries of Pittsburgh and Detroit; who has not thrilled at sight of Chicago's

WACKER DRIVE—CHICAGO

The numbered buildings shown in the illustration are: (1) 333 Building. (2) Mather Tower (75 East Wacker Drive. The office of VETERINARY MEDICINE is located in this building.) (3) Bell Building, with the Chicago Motor Club Building shown just in front of it. (4) The Carbon and Carbide Building. (5) Pure Oil Building. (6) LaSalle-Wacker Building. (Office of the American Veterinary Medical Association is located in this building.) (7) Builders' Building. (8) Engineers' Building. (9) Morrison Hotel. (10) Steuben Club.

sky line from the lake; or traveled the marvelous productive acres of the Middle West; or viewed from Cheyenne Lodge the plains of Colorado receding for unnumbered miles before the naked eye. Equally necessary is it to stand by the giant Sequoias, the oldest and largest living things on this planet, and to see the semi-tropics of the South, the arctic land of Glacier and the fringe of the traditional infernal regions in Yellowstone. We hope that your itinerary while in America will include at least several of these regions, and better still, all of them and more of equal interest.

An Unsere Besucher aus Mittel- und Südost-Europa!

Wir heissen Sie als unsere werten Gäste hochwillkommen, und freuen uns der Ehre die Sie uns durch Ihren Besuch erweisen. Es ist unser aufrichtiger Wunsch Ihnen den Aufenthalt in unserem Lande so angenehm wie nur möglich zu gestalten, damit Ihnen die Tage der Teilnahme an dem gegenwärtigen Kongresse, und die neuen Freundschaften die sich daran knüpfen, auf immer eine liebe Erinnerung bleiben werden. Mögen Sie einen guten Eindruck von unserem Lande bekommen. Wir sind gerne bereit alles aufzubieten, um ihnen den vollsten Genuss Ihrer Reise zu sichern.

Wir Amerikanischen Tierärzte verdanken den Tierärzten Ihres Landes viel. Wir erinnern uns dankbar und gerne der vortrefflichen Lehrbücher die aus Ihren, oder Ihrer Vorgänger Händen hervorgingen, Werke die uns in unseren Schultagen wertvolle Wegweiser zur Ausbildung waren, und die wir auch heute noch mit Nutzen zu Rate ziehen: Friedberger und Froehner, Ostertag, Edelmann, Lungwitz, Malkmus, DeBruin, Hutyra and Marek, um nur die geläufigeren Namen zu nennen. Wir sind nicht minder stolz darauf, dass schon frühzeitig geistige Beziehungen zu den Wissensquellen der deutschsprachigen Länder bestanden. Es sei hier nur auf Detmers und ähnliche Forscher hingewiessen, die von dort herüber kamen und unserem Lande erspriessliche Dienste erwiesen. Nicht weniger bedeutend ist die Anzahl der Amerikanischen tierärztlichen Erzieher —wir denken hier an Billings, Adams, White, Bennett, Cary, Connaway, Fischer, Peters, Brumley—die ihr Wissen und ihre Kenntnisse an Ihren Wissensquellen bereicherten, zum Wohle unseres Landes.

Unser Willkommengruss ist daher keine leere Formalität, sondern ein Zeichen, aufrichtiger Hochschätzung der Tierärzte Ihres Landes, Ihrer dortigen tierärztlichen Einrichtungen und Leistungen.

Wir glauben dass es uns nicht als Ruhmredigkeit ausgelegt werde, wenn wir darauf hinweisen wie wir zu dem reichen tierärztlichen Erbe das wir von Europa übernommen haben, auch unsern Teil beigefägt haben, um es der Nachwelt vermehrt zu übergeben. Fünfzig landwirtschaftliche Versuchsanstalten dienen uns zur tierärztlichen Forschung. Erwähnung verdient auch die tierärztliche Forschungsstelle der tierpathologischen Abteilung des Rockefeller Institutes für medizinische Forschung. Dieses Institut bietet durch seine Stipendien den begabten Tierärzten der ganzen Welt Gelegenheit sich wissenschaftlich auszuzeichnen. Die Forschungsarbeiten in den verschiedenen tierärtlichen Instituten sind meistens den örtlichen Bedürfnissen angepasst, gleichwohl haben die Forschungen von Ransom und Hall über den Lebenskreislauf der Parasiten und die darauf aufgebauten Massnahmen zur Behandlung und Verhütung der Wurmkrankheiten, die Arbeiten Schröders und Cottons über den Bangbazillus, die Erfolge von Dorset und seinen Mitarbeitern auf

dem Gebiete der Schweinepest, und die bemerkenswerte Entdeckung von Curtice, Kilbourne und Smith bezüglich der Insekten als Zwischenträger von Krankheiten, Anwendung auch ausserhalb unseres Landes gefunden, und dazu beigetragen unsere Schuld an die Alte Welt zum Teil abzutragen.

Es gereicht uns zur besonderen Genugtuung dass einige Bestrebungen zur Hebung des Volkswohls durch die Verhütung und Ausrottung von verheerenden Tierseuchen, der ganzen Welt vorbildlich geworden sind. Unsere mustergiltig eingerichtete bundesamtliche Fleischbeschau überwacht jährlich die Schlachtung von fünfundsiebzig Millionen Tieren. Ungefähr ein Tausend Tierärzte sind dabei vollamtlich angestellt. Wir werden es uns zur besonderen Ehre anrechnen, wenn Sie nach beendeten Kongressverhandlungen nach Chicago kommen und persönlich Einsicht in die hier geleistete Arbeit nehmen.

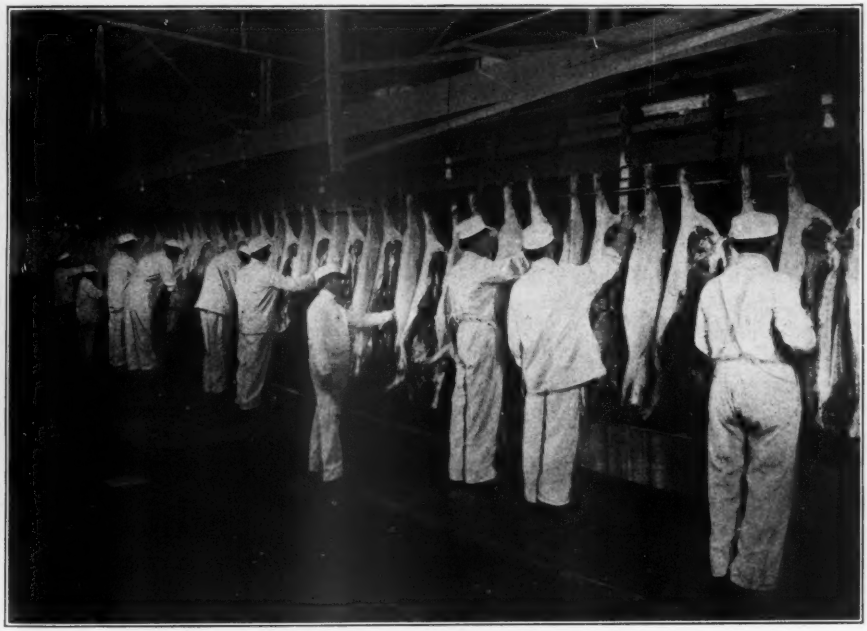
Der Erfolg mit dem es uns gelungen ist, ausländische Tierseuchen von unseren Ufern fernzuhalten, ist ein weiteres Ruhmesblat unserer tierärztlichen Geschichte, und wir möchten Ihre Aufmerksamkeit auf unser Tuberkulose-Tilgungs-Verfahren, als besonders beachtenswert, lenken. Wir haben die Überzeugung gewonnen

SANS SOUCI PALACE, POTSDAM, GERMANY

This group shows a portion of the American party who attended the Eleventh International Veterinary Congress, London, 1930. American veterinarians shown in the picture, left to right, are: Top row, J. F. DeVine, E. Sunderville, E. L. Volgenau, A. T. Kinsley, and H. D. Bergman. Second row, Major J. D. Derrick, F. L. Stein, J. H. Lenfestey, and C. H. Stange. Third row, E. M. Dobbs, G. H. Hart, F. M. Hayes, A. F. Schalk, C. B. Outhier, and J. S. Buckley. Fourth row, H. E. Curry, B. J. Crespo, E. B. Ackerman, John R. Mohler, H. M. McConnell. Fifth row, F. R. Beaudette, J. San Miguel, W. E. Cotton. Front row, H. K. Miller.

Public Stock Yards, Edinburgh, Scotland

dass dieses Programm im Auslande Missverständnisse hervorgerufen hat. Man scheint unter dem Irrtume befangen gewesen zu sein, dass unser Verfahren verhältnismäsig einfach gewesen wäre, da zu Beginn des Tilgungsverfahrens nur vier Prozent der Rinder tuberkulös verseucht waren. Scheidet man jedoch die kolossalen Rinderherden des Westens und Südens, in denen Tuberkulose soviel wie unbekannt ist, für die Berechnung der Prozentzahl aus, dann dürfte das



FEDERAL MEAT INSPECTION

The Federal meat inspection includes an anti-mortem inspection of the animals before they enter the abattoir, an inspection at the time of slaughter, throughout processing and until the meat and meat products enter the channels of trade.

Bild der Tuberkuloseverseuchung des Molkereibetriebes des Ostens demjenigen der europäischen Milchwirtschaften gleichen. Das bundesamtliche Tuberkulose-

Army Veterinary Hospital Fort William McKinley.

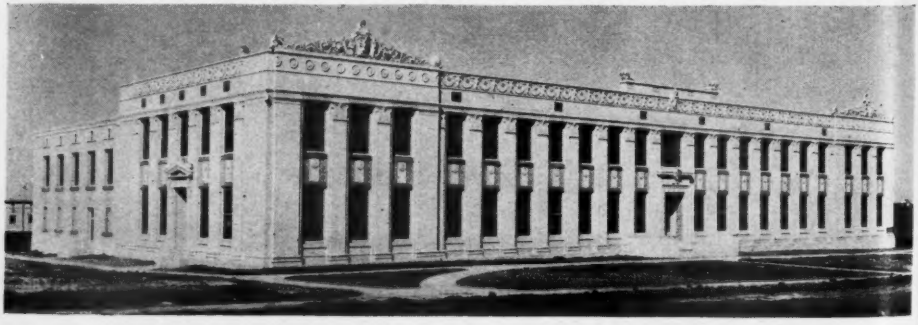
vertilgungsverfahren hat die Seuche im Lande beinahe um zwei drittel reduziert. Ganze Staaten sind jetzt vollkommen seuchenfrei.

Die Ursachen warum die Tuberkulose Vertilgung in anderen Ländern weder aussichtsreich noch praktisch ist, sind mancherlei; auf jeden Fall spielen aber weder der Prozentsatz der Infektion, noch die Kosten eine Rolle. Im Gegenteil, je grösser die Zahl der ausgemerzten nutzlosen kranken Tiere, desto grösser der Nutzen von der verbleibenden gesunden Herde. Dieses Verfahren hat sich überall als durchführbar erwiesen, gleichviel ob die Verseuchung nur 0.5% oder 60% ausmachte. Seit wir den praktischen Nutzen der Vertilgung einer Seuche kennen gelernt haben, können wir uns für die blossen Beschränkungsmassregeln nicht mehr begeistern.

Wir geben uns der angenehmen Hoffnung hin dass Sie die Gelegenheit Ihres Aufenthaltes in New-York dazu ausnützen, auch das Innere des Landes kennen zu lernen. New-York ist keineswegs typisch für die Vereinigten Staaten. Unser Land ist ein Land vieler Besonderheiten. Niemand kann sich rühmen die Vereinigten Staaten zu kennen, der nicht die Prachtbauten Washingtons gesehen hat, oder die Fabriken in Pittsburgh und Detroit, der nicht Chicagos Silhuette, vom See aus gesehen, auf sich wirken liess, der nicht durch die fruchtbaren Getrei-

defelder des Mittelwestens gefahren ist, der nicht von Cheyenne Lodge aus die fruchttragenden Ebenen Colorados auf Meilen hinaus mit dem Auge verfolgt hat, der nicht unter den Baumriesen des Yosemite Thales bewundernd gestanden hat, den ältesten lebendigen Urkunden der Vorzeit, der nicht den halb-tropischen Süden kennen gelernt hat, oder die arktische Schönheit des Glacier National Parkes, oder die geheimnisvollen Wunder des Yellowstone Parkes.

Lasst uns hoffen dass Ihr Aufenthalt in Amerika zum wenigsten die eine oder die andere der vorgenannten Sehenswürdigkeiten einschliesst.



Veterinary Building, Texas A. & M. College, College Station, Texas.

Aux Visiteurs Des Pays Mediterranee Littorale:—

Nous sommes heureux d'avoir l'honneur d'être le hôte des vétérinaires de votre pays et nous souhaitons que votre séjour parmi nous sera rempli de plaisir le plus precieux; que vous profiterez, en pleine mesure, des compléments qui vous attirér chez nous; que vous garderez des assez beaux souvenirs de votre visite dans l'avenir de votre voyage au Douzième Congrés de Médecine Vétérinaire, de vos expériences et distractions en Amerique et que vous cheririez la connaissance des amis que vous aviez fait.

Que vous tenissiez un esprit bienveillant de nous et de notre pays est notre désir le plus distingué et que nous puissions l'entrainer, nous demandons seulement que vous nous faites savoir comment nous pourrions augmenter votre bonheur. Nous sommes à votre service.

La science vétérinaire de notre pays fait honneur au pays de sa naissance pour lequel nous sommes bien reconnaisant. Nous n'oublions pas l'ancienne origine de la médecine vétérinaire de l'Egypte, Grec, Byzance et de Rome, ni que la science vétérinaire a fleurit par les écoles de Lyon et d'Alfort. Les travaux de Chauveau, Zundel, Moussu, Nocard, Cadeac et Neumann ont contribués d'une manière distinctive aux enseignements de nos éléves vétérinaires et ils ne manque pas de nous conseiller actuellement. Le nom de Liautard reste digne dans l'en-

Michigan Avenue, Chicago, from A Century of Progress Exposition Grounds. The odd building in the foreground is the Federal Building at the World's Fair; the water, the North Lagoon of the Fair; the building back of the fountain is the Shedd Aquarium in Grant Park; the skyline includes a three-mile stretch of buildings on Michigan Avenue.

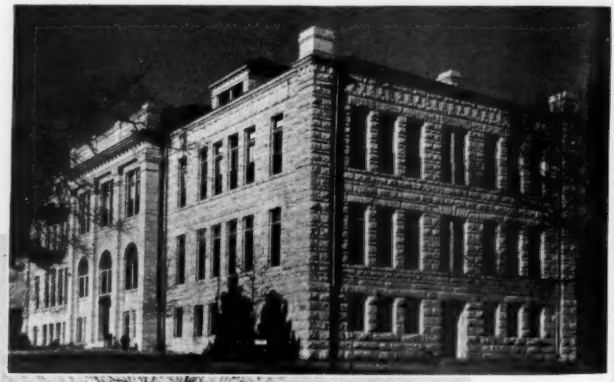
seignement vétérinaire des Etats Unis. C'est à lui qu'on donne l'honneur d'ayant fondé la littérature propre de notre profession. Pour ceux-la et pour les contributions diverses de vos compatriotes le fameaux Pasteur, Bourgelat, Bouley, Spallanzani et des autres sans nombres, nous somme hautement reconnaisant. Ainsi, votre bienvenu vient du coeur, engendré par l'appréciation de vous et de la profession vétérinaire de vos pays divers.

Si on n'outrage pas les priviléges d'un hôte ou ne dépasse pas les bornes des conventions habituelles nous prendons l'honneur de raconter quelques pas que nous avons fait par les travaux, les enseignements, et les inspirations recurent des branches de la profession vétérinaire des pays bien plus anciennes que le notre. Nous avons cinquante stations agricoles expériment ales établiés à travers du pays, dans lesquelles des recherches de la science vétérinaire sont accomplis. En général, les investigations entreprises sont d'un caractére local.

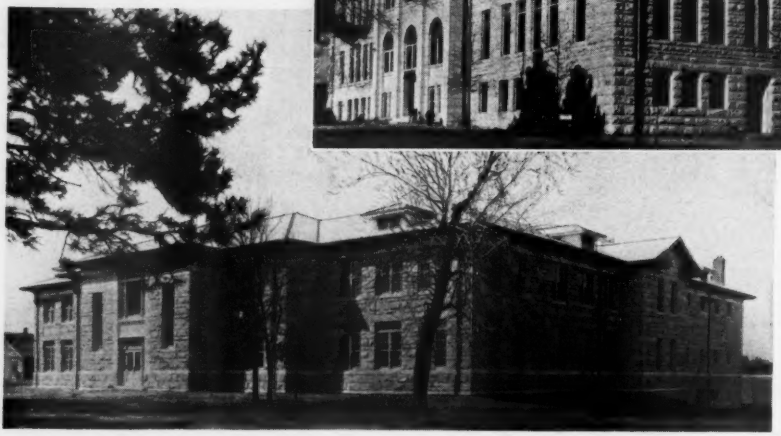
D'ailleurs, on croit que le department de pathologie animale du *Rockefeller Institute for Medical Research* et ces fonctions d'agrégé pour les éléves vêtérinaires, les recherches de Ransom et Hall sur les histoires vitales des helminthes et leur contrôle, les travaux de Schroeder et Cotton sur le bacille de Bang, les découvertes de Dorset et ces colaborateurs dans la champ de peste procine, et les investigations heureuses et bien connues de Curtice, Kilbourne et Smith sur les infections transmises par des vecteurs parasitaires, sont quelques ceuvres qui nous permis d'y signaler.

Nous sommes aussi heureux de dire que quelqu'unes de nos contributions à la santé publique et des grands projets de prévention, de contrôle, et d'éradication des maladies animales ont une certaine valeur pour tout le monde.

Notre service de l'inspection des viandes comprise une inspection profes-



Right: Veterinary Hall, Kansas State College, erected in 1908.



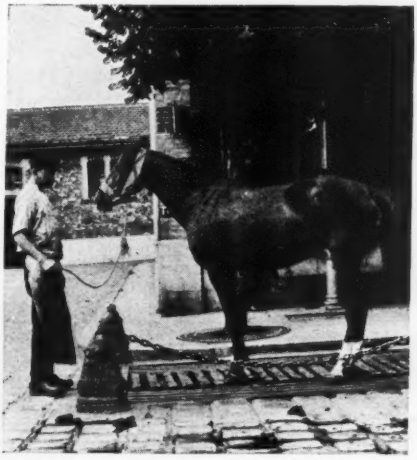
Left: Veterinary Hospital, Kansas State College, erected in 1923.

sionelle de soixante-quinze millions d'animaux par ans avec un examen complet de ces animaux du temps qu'ils arrivent au marché, avant et au temps d'abatage, pendant la préparation des produits divers et leur transportation. jusqu'à ils soient délivrés à les charcuteries. A peut prés, 1,000 vétérinaires s'occupent dans ce service. Nous serons heureux de vous conduire en face de cette vaste service quand vous ferez votre visite à Chicago aprés le Congrés.

Nous pensons aussi que notre méthode de bannir de nos côtes toutes les pestes animales étrangères devrait être une

Milk delivery in Brussels, Belgium.

exemple à suivre en général par tous les pays. Pendant votre séjour parmi nous vous êtes invités de cultiver une propre connaissance de notre projet national de l'éradication de la tuberculose bovine. Nous croyons que ce project, qui marche si bien vers le désideratum, est mal connu dans les pays étrangers où on se fait croire que parceque l'incidence moyenne de le tuberculose bovine dans notre pays était que autour de quatre pour cent quand ce travail fut commencé que notre problème était relativement simple et qu'il n'a pas les mémes complexités et difficultés qu'un même projet aurait dans les pays europiens où l'incidence est dix fois plus haute. Mais, est-ce que vous ne fermez pas les yeux au fait que notre infection de quatre pour cent renferment les grands troupeaux du West et du Sudwest ou l'infection tuberculeuse est trés



Weighing a horse before slaughter, Municipal Abattoir, Paris.

rare ou n'exist point? La verité c'est que ses sections laitières de l'Est et parmi les états centrals (une aire comparable en largeur et en population bovine avec les pays les plus grands d'Europe), le degré de l'infection tuberculeuse bovine, dix ans passés, était comparable avec celle-la des endroits du même genre dans les pays europiens. Rendez vous bien compte que c'est dans ces endroits hautement infectés que le plupart du travail d'êradication a eu lieu. D'ailleurs, cela qui est encore plus important c'est que le système d'éradication a été derigé le plus heureusement dans les régions les plus hautement infectées. Malgré les notions fauses desfois entretenues, c'est dans les régions fortement infectées que le système se trouve le plus convenable et le plus profitable pour les exploitations. Des états entières ont été debarrassés de l'infection ou reduits de la maladie jusqu'au point de disparaitre.

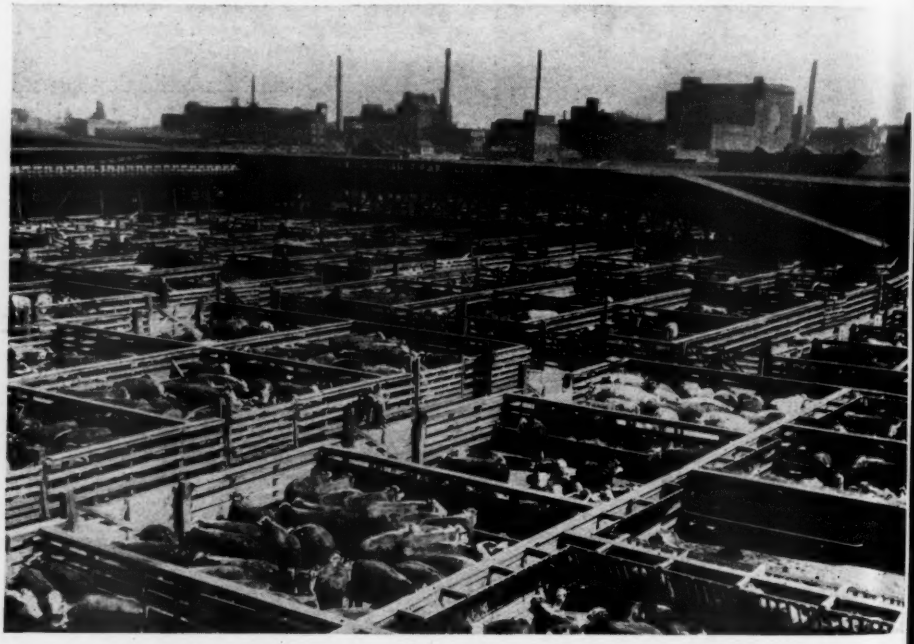
La lutte contre la tuberculose bovine dans les régions les plus infectées a dimin-

ué le moyen de l'infection par deux-tiers pour le pays entière et actuellement elle marche rapidement.

Il y a peut-être maintes raisons pourquoi le système americain contre la tuberculose bovine n'est pas faisable ni convenable dans des autres pays, mais ni les coûts ni le degré de l'infection sont parmi eux, car, le plus haute l'infection le plus profitable on trouve le système. Ayant constaté les avantage de notre méthode, nous ne sommes pas interessés dans des mesures de contrôle. Notre système a été éprouvé pour des grandes aires où l'infection tuberculeuse fut entre 0.5% a 60% sans aucune faute étant été revelée.

Pendant votre séjour en Amerique nous ésperons que vous ferez des connaissances de notre pays au dela du douanier. Personne qui demeure à New York vous dirait que son domaine est typique des Etats Unis et les restes de nous regrette qu'on ne peut pas le nié.

Comme vous le savez le notre est un pays de largeur et de maintes modéles. On a guère de conception des Etats Unis sans avoir vu les edifices magnifiques de Washington; les industries de Pittsburgh et de Detroit; la cime des grats ciels de Chicago dés la lac de Michigan, qu'est parmi les attraits les plus magnifiques; le voyage à travers des vaste aires productives du Middlewest et les prairies qui se retire avant l'oeil en milles sans bornes; les Sequoies gigantesques les plus vieux êtres vivants de cette planéte; nos régions demi-tropique du Sud et la terre arctique des glaciers du Nord; notre "bord de l'infer" de Yellowstone Park; la Cheyenne Lodge; et bien des autres spectacles attrayants sans nombres qu'on pourrait ajouter à votre itinéraire. Espérons nous que vous aurez le bonheur de voir au moins quelqu'unes de ces lieux sinon tout le groupe ci-inclus et bien des autres.



SECTION OF THE UNION STOCK YARDS, CHICAGO

The stock yards fire, May 19, 1934, occurred in the area shown in the upper right hand corner. The stock yards cover an area of 640 acres. The buildings in the background are Chicago packing houses.

Veterinary Quadrangle, Iowa State College, Ames, Iowa.

A Nuestros Visitantes de Espana y de las Republicas Latino-Americanas:

Son ustedes nuestros invitados. Ello nos enorgullece en alto grado. Es nuestro más sincero deseo que su estancia entre nosotros sea colmada de placeres; que logren Uds. plenamente todos los objetivos que les trajeron a estas tierras; que en los años venideros sientan alegría al rememorar estos días—su viaje al Duodécimo Congreso Internacional de Veterinaria—sus experiencias en los Estados Unidos, y que en sus corazones vivirá el grato recuerdo de la amistosa acogida de que fueron objeto por nuestra parte durante su permanencia aquí. Deseamos ardientemente que conserven siempre una sincera amistad por nosotros y les rogamos que nos indiquen la forma en que podríamos contribuir a que su corta estancia en ésta sea de lo más alegre y feliz. Estamos a sus órdenes.

Contemplamos con admiración la nueva

INTERNATIONAL LIVE STOCK EXPOSITION, CHICAGO

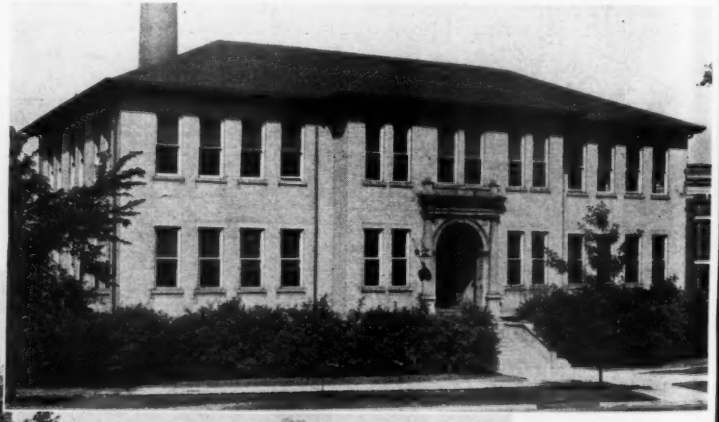
This building, Dexter Pavilion, where the Horse Shows and the students stock judging contests were held each year during the International Live Stock Exposition, was burned in the fire in the Union Stock Yards, May 19, 1934. It is planned to have a newer and finer exposition building ready for use for the next International Live Stock Exposition in December.

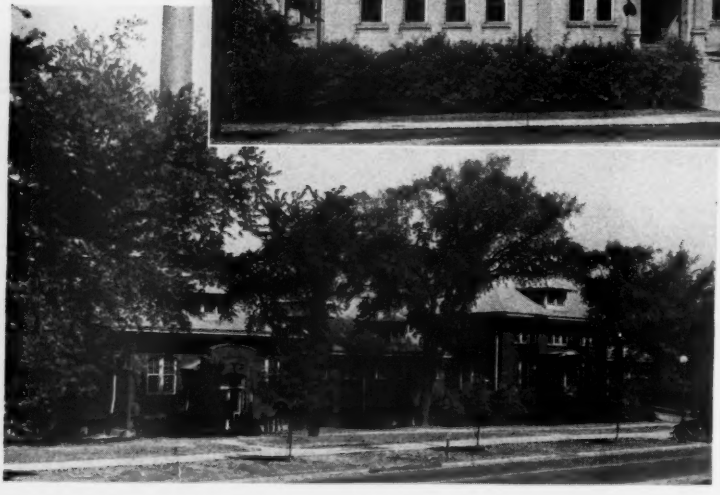
organización del gobierno de España para la prevención, control y tratamiento de enfermedades de animales de aquel país, y notamos con gran satisfacción el hecho de que dicha organización no solamente está modelada sobre nuestra propia organización federal para el control sanitario del ganado, sino que constituye una mejora material sobre la nuestra, ya que todo lo concerniente a la salud de los animales ha sido puesto bajo la dirección de veterinarios. Felicitamos también a los veterinarios españoles por los excelentes medios aportados para la educación de veterinaria, y por los altos logros profesionales que se requieren de aquellos dedicados a cualquier ramo de servicio veterinario.

Animal Industry Experiment Station, Rio de Janeiro, Brazil.

Esperamos que de la expansión y ensanche de nuestras relaciones con los guardianes de la salud del ganado en las Repúblicas Latino-Americanas resulten muchos beneficios. El transporte moderno ha hecho que las plagas de animales en cualquiera de las Américas sea de la incumbencia de todos y abrigamos

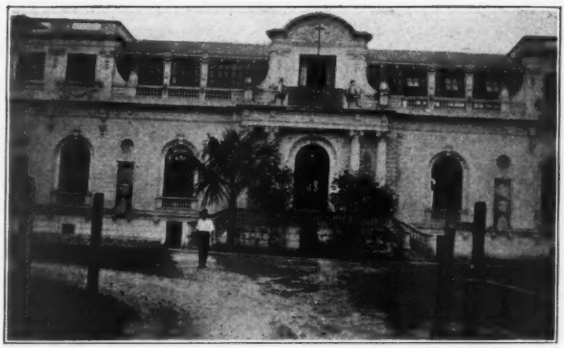
Right: Veterinary Laboratories, Ohio State University.





Left: Veterinary Clinic and Department of Pathology, Ohio State University. The Pathology Department is at the right of the main entrance and extends beyond the margin of the picture.

la esperanza de llegar a establecer con los veterinarios de todas naciones latino-americanas una completa inteligencia y amplia cooperación como la que existe desde hace mucho tiempo entre la profesión veterinaria de esta país y la del Canadá—una cooperación que se ha hecho necesaria por la accesibilidad aun con medios de transporte más primitivos.

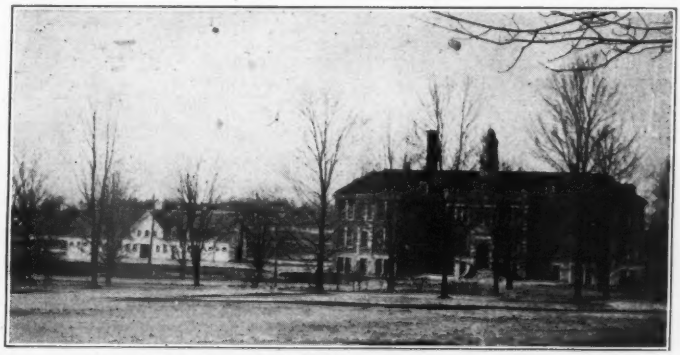


Superior School of Veterinary Medicine Nictheroy, Brazil.

Queremos no ser tachados de inmodestos o que violamos los privilegios de anfitriones si señalamos en parte los usos que hemos hecho de la información recibida de algunas ramas de la profesión veterinaria mucho más antiguas que la nuestra. Hay en este país cincuenta estaciones agrícolas experimentales, donde se llevan a cabo estudios e investigaciones de veterinaria. Las cuestiones que se investigan son generalmente de índole local, pero se cree que las contribuciones a la ciencia veterinaria que se han hecho por el departamento de patología animal del Instituto Rockefeller para Investigaciones Médicas y el cangeo de estudiantes de veterinaria; las investigaciones y estudios de Ramson y Hall sobre el ciclo de vida de las lombrices y de los medios de impedir y tratar la lombriz en los animales; la obra de Schroeder y Cotton, con los organismos de Bang; los notables triunfos de Dorset y compañeros en el ramo de la cólera del cerdo y el famoso descubrimiento de Curtice y Kilborne y Smith en la cuestión de enfermedades propaladas por insectos han, en cierto grado, pagado nuestra deuda a las ramas más antiguas de la profesión.

Celebramos igualmente que algunas de nuestras contribuciones a la salud pública y a los grandes proyectos de control para la prevención y extirpación de enfermedades de animales hayan sido de valor para todo el mundo. Nuestro servicio de inspección federal de carnes comprende un esmerado examen profesional de 75.000.000 de animales al año, lo cual implica la supervisión completa de estos animales desde el momento que llegan a los mercados centrales, antes y durante la matanza, durante su manipulación y embarque, hasta que entran en las vías del ramo al detalle. Hay aproximadamente 1.000 veterinarios que dedican todo su tiempo a este trabajo. Nosotros apreciaremos que inspeccionen Uds. este servicio de salud pública inmediatamente después de la celebración del Congreso.

También creemos que nuestro éxito en impedir la propagación de plagas extranjeras de animales en nuestras manadas y rebaños puede servir de ejemplo a imitar como de utilidad general y llamamos especialmente su atención para que durante su

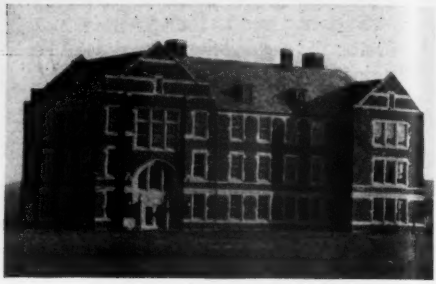


Ontario Veterinary College, Guelph, Ontario.

Bacteriology Building and office of the Dean, Division of Veterinary Science, Michigan State College, East Lansing.

estancia estudien nuestro proyecto nacional para la extirpación de la tuberculosis en el ganado bovino. Creemos que este proyecto ha sido mal entendido y tergiversado en muchas partes. Parece que se ha llegado a la conclusión de que en virtud de que la infección media de tuberculosis de animales en este país no era más que de cuatro por ciento cuando se emprendió la obra de extirpación de la tuberculosis, nuestro problema fué relativamente pequeño y no presentaba las complejidades y dificultades que presentaría un proyecto similar en una nación europea donde el promedio de infección tuberculosa era, y es, como diez veces mayor. Al parecer no se ha tenido en cuenta que el promedio de infección de cuatro por ciento comprendía los enormes rebaños en los ranchos y haciendas del Oeste y el ganado de los estados del Sur, ya que en ninguno de dichos territorios apenas existía dicha infección tubercular. En los densos territorios dedicados a la cría de vacas de leche en los estados del Este y del Norte central (un área comparable en extensión y población de ganado a las mayores naciones de Europa) el grado de infección tubercular entre las vacas de leche hace diez años era comparable a la infección en similares territorios dedicados a la producción de leche en Europa, y es precisamente en estos territorios altamente infectados donde se ha hecho la mayor parte del trabajo de extirpación y en el cual los esfuerzos fueron coronados con el más lisonjero éxito, y donde se ha logrado la más entusiasta acogida por parte del público y la labor ha sido más lucrativa. Estados completos en estas áreas infectadas han sido librados del terrible azote, o sus efectos han sido reducidos casi a cero.

Esta obra, principalmente en los distritos muy altamente afectados, ha reducido tres



Veterinary Anatomy and Pathology Building, Michigan State College.

cuartas partes la infección media de todo el país y está actualmente progresando con gran rapidez. Debe de haber numerosas razones porqué el "Plan Americano" para la extirpación de la tuberculosis en el ganado bovino no es factible ni practicable en otros países, pero el grado de infección no es ciertamente una de ellas, ni lo es tampoco el costo del plan, ya que cuanto mayor sea el porcentaje de infección, más lucrativa resulta su extirpación. Nuestro plan ha salido airoso de las pruebas en grandes extensiones, en las cuales el grado de infección

Veterinary Clinic Building, Michigan State College.

variaba desde menos de la mitad del uno por ciento hasta más del 60 por ciento, y bajo las condiciones que prevalecen en los Estados Unidos dicho plan ha demostrado

Prof. L. Panisset, National Veterinary School, Alfort.

Prof. Dr. V. Stang, Director, Institute of Animal Husbandry, Veterinary College, Berlin.

Dr. A. Eichhorn, Chairman, Organizing Committee 12th International Veterinary Congress.

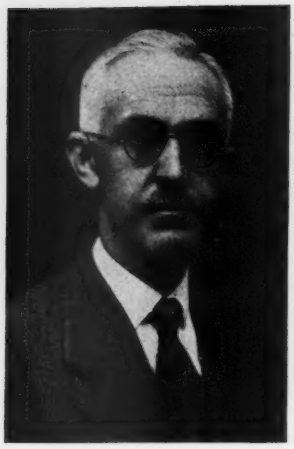
estar exento de puntos vulnerables o débiles. Habiendo observado en la práctica las ventajas de la extirpación de la tuberculosis bovina, la preferimos a toda clase de medidas de control, no importa el éxito de éstas.

Mientras estén ustedes aquí esperamos que se decidirán por ver algo de nuestra tierra más allá del litoral. Nadie que viva en Nueva York consentirá en que se le considere típico de los Estados Unidos, y no hay nadie del resto de nosotros que no resintiese tal alusión. Este país es una tierra de múltiples facetas. Nadie podrá presumir de tener un cabal concepto del mismo si no ha visto los majestuosos edificios de Washington, u observado de cerca las industrias de Pittsburgh y Detroit, o sentido admiración ante la línea de rascacielos de Chicago vista desde el límpido Lago Michigan.

Dr. José Figueroa, Director of Live Stock Department, Mexico City.

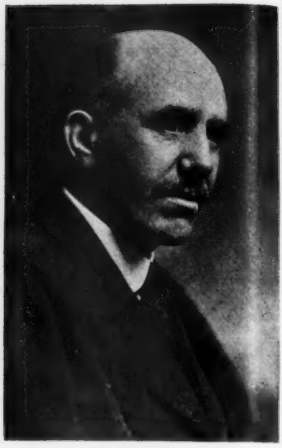
Dr. Ionescu Briala, Director-General, Animal Husbandry, Bucharest.

Prof. J. D. Stewart, Dean, Veterinary Science, University of Sydney.



Dr. C. Sanz Egana, Professor, Veterinary School, Madrid.

Prof. Dr. F. Benesch, Chief, Obstetrical Clinic, Veterinary College, Vienna.



Dr. C. D. McGilvray, Principal, Ontario Veterinary College, Guelph.

Nadie podrá jactarse de conocer los Estados Unidos si no ha atravesado las inmensas y productivas tierras de la región central; que no haya contemplado absorto la Cheyerine Lodge y las planicies de Colorado que se alejan más y más ante nuestra vista por millas y millas; es igualmente necesario verse uno junto a los gigantescos árboles llamados Sequoias — las mayores y más antiguas cosas vivientes de este planeta—y gozar de las escenas semi-tropicales del Sur, la tierra ártica del Glacier National Park y los confines de las tradicionales regiones infernales del Yellowstone. Esperamos que su itinerario durante su estancia en los Estados Unidos les llevará por varias de estas regiones por lo menos, o mejor aún, por todas ellas y muchas otras igualmente interesantes.

Dr. J. Share Jones, Director, Veterinary Studies, University of Liverpool.

★ ★ ★ ★

Radio Program

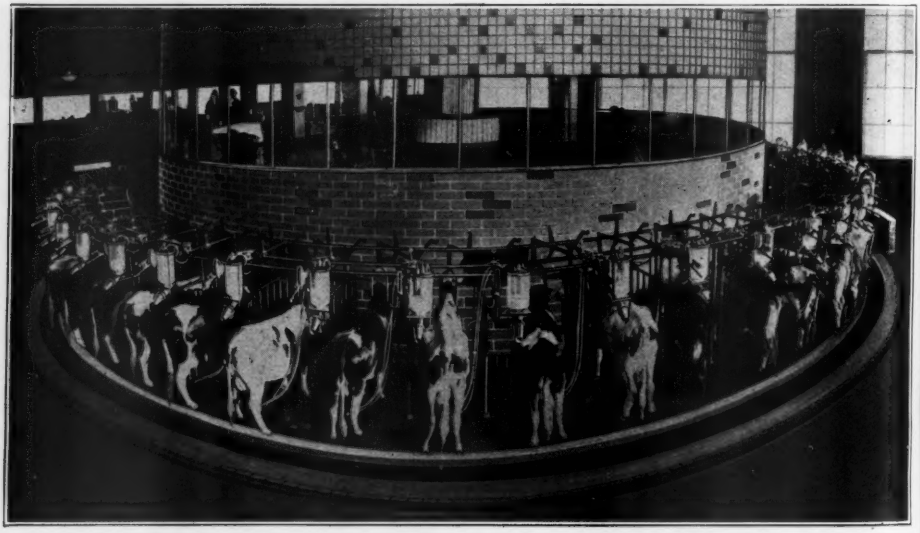
During Congress Week, there will be two half-hour radio broadcasts over a coast-to-coast hook-up of the National Broadcasting Company. This feature of the program will be given during the Farm and Home Hour of the United States Department of Agriculture. The broadcasts will be on Tuesday, August 14, from 12:50 to 1:20 p. m., Eastern Standard Time; 11:50 a. m. to 12:20 p. m., Central Standard Time; 10:50 to 11:20 a. m., Mountain Standard Time, and 9:50 to 10:20 a. m., Pacific Standard Time, and at the same hour on Thursday, August 16.

During the first period (Tuesday), short addresses will be made by prominent members of the Congress from England, Germany and the United States. During the second period (Thursday), the broadcasts will be delivered by noted veterinarians from Argentina, France and Italy. The addresses in foreign languages will be rebroadcast immediately in English.

FRANKLIN DELANO ROOSEVELT
President, United States of America
Patron, 12th International Veterinary Congress

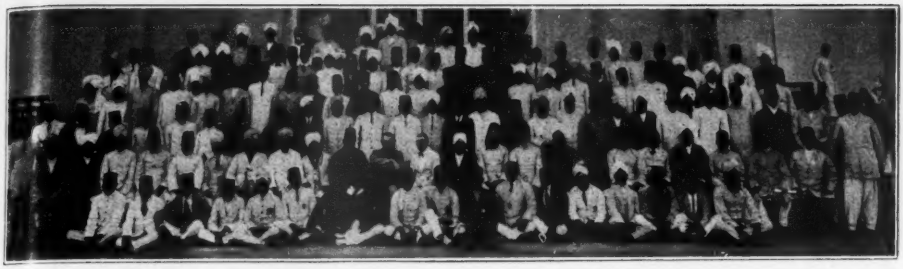
The Reticulo-Endothelial System

The reticulo-endothelial or histiocytic system of Aschoff is one of those new physiologic conceptions which arrive from time to time to bring clarity into the science of medicine. The "system" as one reads about it in the literature without trying to digest the text with one's common knowledge would be baffling, although it is nothing more than an elaboration on the teachings of Metschnikoff on the action of leucocytes and other cells against bacterial invasion. Although the defensive elements (cells) of the body grouped by Aschoff (1913) have been augmented, the principle of grouping them all into one "system" remains to his credit, for it was he who conceived the notion of bringing into one group all of the somatic elements capable of capturing foreign invaders of the body animate or inanimate that are suspended in the humors. In addition to the well known phagocytes of Metschnikoff, physiologists after him have realized that there were other cells of the Metschnikoff genre instrumental in defending the living body against invasion. Cells of this functional genre exist in the spleen, lymph nodes, liver, marrow, perivascular network, connective tissue of the testicles, kidneys, thymus and certain connective cells of the pancreas. To all of these, various authors have added others. Gozzang adds the microglia of the nervous system; Oberling, the connective pigment cells; Policard, the endothelial cells of the pulmonary alveoli, and others include the network of the fibroblasts.



SUPER MILKING MACHINE IN A CERTIFIED DAIRY

The Rotolactor, a rotary milking combine at the Walker-Gordon Laboratories Company, Plainsboro, N. J. This super milking machine consists of a revolving circular table, 60 feet in diameter and contains 50 stalls in which cows are washed, dried and milked while they make one complete circuit, which requires 12½ minutes. The apparatus is equipped with milking machines, milk weighing scales and facilities for washing cows. It is capable of milking 1680 cows three times daily and requires but two men to operate it, or eight men in four six-hour shifts. It is used in a herd producing certified milk for distribution in New York City. The table turns continuously but slowly, and one cow is constantly entering it for a 12½-minute ride and another always leaving it to return to her place in the cow barn. This dairy is included in one of the sightseeing trips incidental to the International Veterinary Congress and will no doubt be inspected by a large number of those attending the Congress.



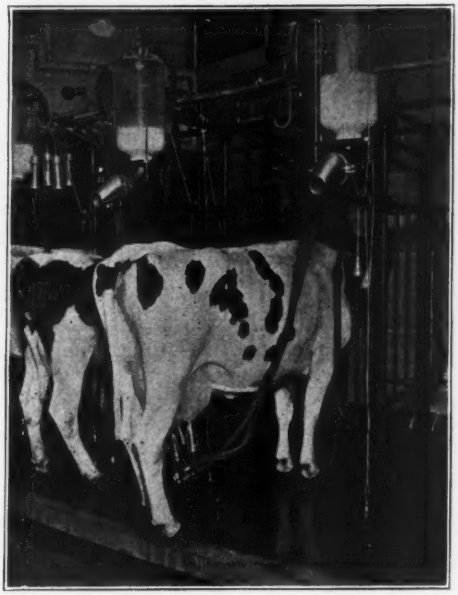
UNITED PROVINCES VETERINARY MEDICAL SOCIETY OF INDIA
The group includes those in attendance at the Fifth Annual Meeting of the Society at Agra, U. P., India.

Together with the phagocytes of Metschnikoff the "system" of defensive cells is widely distributed through the body and is complex, but as a unit it has but a single function. As such it is simple enough. The group of cells included, guards the body against foreign invaders.

The reticulo-endothelial system might be likened to an army of defenders of which Metschnikoff's phagocytes is but a regiment of infantry. An army ever ready to repel invasion or curb rebellion. According to Counelle, the cells of the group pounce upon any harmful element or foreign element passing along in the plasma wherein they become veritable leucocytes of Metschnikoff. In fact, the reticulo-endothelial system is capable of giving birth to every known species of blood cell (Florentin, Revue Medicale de l'Est, vol. lxi, March, 1933). From this fact alone, one may estimate the importance of its utilization in therapeutics. It seems evident when this defensive force is more generally understood we shall hear less about the phagocytosis of Metschnikoff in pathology, immunology, and therapeutics, and more about the role of the reticulo-endothelial system.—L. A. M.

Colloidal iodine is a liquid consisting of extremely fine particles of free or uncombined iodine held in suspension in water by the aid of acacia.

It has been established that the antirachitic potency of egg yolk is influenced by the ration fed to the laying hen and the exposure of the birds to sunshine or ultraviolet irradiation. Hughes, Payne, Titus and Moore (1925), and Hughes, Titus and Moore (1925), found that the amount of ultra-violet light which a hen receives is an important factor in determining the antirachitic vitamin content of the eggs produced when the feed is low in the antirachitic vitamin.



Close-up view of the Rotolactor. The milk goes from the cow's udder to the glass jar above without exposure to the air or contamination.

Common Nematodes and Cestodes of the Horse*

By W. R. TEETER,
Veterinary Division,
Michigan State College,
East Lansing, Michigan.

INTESTINAL parasites may act in three different ways:

1. By irritating the nerve endings and occasioning in a reflex way the various symptoms of helminthiasis. This is the rôle in which it is supposed to be most often recognized.[1]

2. By secreting toxins which in certain cases act on the blood bringing out the destruction of hemoglobin and red corpuscles, while in other cases they act on the nerve centers. Intestinal parasites may thus play a considerable part in the development of anemia and the nervous disorders observed in helminthiasis.

3. By producing ulcerations of the intestinal mucosa, thus facilitating the absorption of toxins and permitting the mucosa to be infected with pathogenic bacteria existing in the contents of the intestine. They may thus be the inoculating agents of numerous affections of the intestine and liver, as well as of infection of intestinal origin.

Of the ascaroidea there are only two families, the ascaridae and oxyuridae. The *Ascaris equorum,* and the *Oxyuris equi,* the common round worms and pin worms respectively are the most prevalent.

Of the strongyloidea, there are the *Strongylus vulgaris* and the *Strongylus armatus,* both commonly known just as strongyles. There are also three other subfamilies of minor importance.

Of the family Metastrongylidae there is one, the *Dictocaulus arnfieldi,* a parasite in the bronchi of horses and other equidae.

Of the Filarids there is one, the *Setaria equina,* a parasite in the peritoneal cavity of equidae and cattle.

There are four members in the Family Spiruridae parasitic in the stomach of the horse *(Habronema megastoma H. muscae, H. microstoma* and *Gongylonema scutatum).*

Very occasionally the kidney worm of the horse is seen. It is the *Dioctophyme renale.* There is one species of whipworm in the horse, Trichuris sp.

Of the tapeworms there are only three: *Anoplocephala perfoliata, A. plicata, A. Mamillana.* Tapeworms are rare and perhaps of little economic importance.

Some life cycles of the more common worms are given as illustrations.

Ascarids

Ascaris equorum, the common roundworm of the horse, is most important in young animals. Due to the simple life cycle it is very easy for animals to become infected. The mature ascarid is yellowish white, cylindrical, 6 to 12 inches long and tapers at both ends. Hundreds of these worms have been found in a single heavily infested case. The ascarids of horses, cattle, swine and humans are much the same in the general macroscopic features, but vary greatly in size. Usually they are infective only for their specific hosts. Their usual location is the upper part of the small intestine, less commonly the stomach or lower intestine.

Life history.—The microscopically small ascaris eggs are laid by the female in the intestine. The eggs pass out in the feces and under favorable conditions of temperature and moisture develop within the shell an embryo which is then infective. Two weeks are required for the foregoing stage to take place, after which they lie dormant until swallowed by a susceptible animal. Should an unembryonated egg be swallowed

[1]Action Pathogene Des Parasites de L'intestin, *Archives of Parasitology,* 1905, vol. 9, pp. 175-186.

*Condensed discussion presented at the Veterinary Short Course at the Michigan State College, Jan. 23-26, 1934.

it will pass through the stomach and intestine without undergoing any further change and be passed out in the feces just as in a newly laid egg. When the embryonated egg enters the intestine the shell is dissolved and the larvae emerges. It penetrates the intestinal wall and enters the veins by which it is moved to the liver, thence to the heart and lungs. Here they pause awhile and undergo a period of growth. About one week is required for this part of the trip. From the lungs the larvae pass up the bronchioles to the bronchi then to the trachea, and due to the irritation caused by these migrations the animal coughs, bringing them up to the larynx and pharynx where they are swallowed. They then pass to the small intestine and mature in two to three months.

Symptoms. — Horses and foals infested with the mature worms call attention to their condition by colicky symptoms often accompanied by alternate diarrhea and constipation. The hair is usually harsh and dry; the animals are dull and listless, colts are often stunted in their growth. Impaction, torsion, and rupture of the intestines have been known to result from heavily parasitized cases where the intestines have been obstructed.

Pinworms

The life cycle of *Oxyuris equi* (pinworm) is much the same. They cause an anal pruritus very similar to that caused by pinworms in man.

Strongyles

There are five species of strongyles infesting the horse. They are commonly known as the palisade worms and blood worms. They differ from ascarids in size; they are much smaller, varying in length from ⅓ to 2½ inches; they attach to the intestinal mucosa by means of teeth and suckers. The fact that they do not remain in one place for any length of time, but are continually reattaching in other locations, makes them especially irritating to the mucosa.

Life Cycle.—The life cycles of *Strongylus vulgaris* and *Strongylus armatus* are very similar. The eggs are liberated in the intestine of the host by the female worm. These are passed out with the feces and under favorable conditions hatch in a few days on the ground. A larva is liberated which must undergo two molts, after which it is infective. When the grass is wet with dew or rain, the larvae crawl up the blades of grass where they remain until eaten by the horse. These larvae are very resistant to unfavorable conditions such as cold, heat, or desiccation and have been known to be capable of "coming to life" after long periods of time. Upon being ingested the larvae pass directly to the large intestine where they penetrate into the veins, are carried to the liver and heart and then pass with the arterial blood to the anterior mesenteric artery for which they show an especial affinity. Here they remain for some time and when gathered in large numbers may cause symptoms of worm colic. Upon developing they pass back into the intestine and mature. These same larvae have often been found in practically every other organ of the body and in the blood stream.

Symptoms.—The presence of the parasites in the kidneys, surrounding tissues, and arteries makes the horse especially sensitive to pressure in that region and may cause paralysis. If they enter the brain they may cause staggering and a blind, staring look. This is not to be confused with cerebrites or blind staggers as caused from eating moldy corn and fodder in the fall. The location of the parasites in the abdominal arteries causes frequent colics which may be more or less severe. It has been estimated that 90% of the colic in some localities is caused by the strongylus armatus.

Thread Worms

The *Setaria equina* appears to be a relatively frequent parasite of the peritoneal cavity of horses and other Equidae and has also been obserbed in cattle. It often wanders through the tissues and may be found in other parts of the body and sometimes invades the aqueous humor. It is then commonly termed "snake in the eyes." In the eye it may cause inflammation with bulging and opacity of the cornea. It may be removed by operative measures. The males measure from 6 to 8 cm. (2½ inches) and the females from 9 to 12 cm. in length. The pos-

terior extremity of the male ends in a characteristic corkscrew spiral. The embryos are present in the blood vessels of infected animals. The life cycle of this species is not known, but it is probably transmitted from one host to another by some biting insect which becomes infested from the embryos in the blood stream.[2]

Stomach Worms

Of the stomach worms of horses there are four important species — *Habronema Megastoma, H. muscae, H. microstoma* and *Gongydonema scutatum.*

The *Habronema megastoma* is a small, whitish nematode. It is widely distributed in the United States, especially in the southern states. The female measures 10 to 13 mm. (½ inch), and male 7 to 10 mm. in length. These worms live in nodules or tumors in the stomach and parts of the body may be seen projecting from small apertures at the summit of the tumor. Many will also be found free in the stomach contents. The worm swellings are particularly common in July and may seriously interfere with the functioning of the stomach if situated near the pylorus. The larvae of Habronema are associated with skin lesions generally known as "summer sores" which are found along the ventral and lower portions of the body and occasionally in the eyes.

Life cycle.—The embryos pass out in the manure and become ingested by maggots of the house fly as they feed in the manure. The infective stage is reached about the time the fly emerges from the pupal stage and is transferred to the horse when the infected fly comes in contact with the horse's lips or is swallowed by the horse. The latter opportunity arising when the benumbed flies fall into the feed boxes, mangers, and drinking troughs while the temperatures are low in the early morning. The larvae thus ingested escape from the flies in the stomach of the horse and there continue their normal development. It is generally believed that the summer sores arise as a result of the horse lying on floors or soil covered with manure, thereby bringing areas in contact with young larvae in the manure. Infective larval forms from the fly when transferred to a wound cause an increase in the severity of the sore.

[2]Hegner, Root, and Augustina.

Tapeworms

Cestodes in the horse are comparatively few and are probably of minor importance medically. In the strobilum stage (segmented stage), the longest is the family Anoplocephalidae. There are three species belonging to the genus Anoplocephalus. They are, *A. plicata, A. perfoliata,* and *A. mamillana.* None of the life histories is known as yet. The Monieza of sheep belong to this same family. *A. perfoliata* is the commonest one. If the intestines of a horse contain many tapeworms, its wall bulges out here and there and the worms are found in these sacculations. The walls of the latter may rupture and lead to a fatal peritonitis.

Tapeworms rarely lead to any marked disease which then will manifest itself in chronic digestive disturbance possibly in emaciation or anemia occasionally in symptoms of colic. Taenia can be assumed to be the cause of such disturbance only if the proglottids have been seen in the voided feces.

Zusammenfassung

Die Lebensweise der häufigeren Helminthparasiten des Pferdes, und die in den jeweiligen Stadien hervorgerufenen Schädigungen werden in Umrissen besprochen.

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War Declared on Cats

Nature Magazine estimates that there are 120,000,000 cats in the United States. A large number of them are homeless and semi-wild. Ornithologists estimate that these semi-wild cats destroy yearly an average of at least 50 song birds each. Several states have undertaken extermination campaigns against homeless cats as a bird conservation measure.

Acetonemia, or Ketosis in Cows

By J. T. ALSTON,
Tupelo, Mississippi

ACETONEMIA is a disease occurring in milk cows, usually within six weeks after calving, and is characterized by various and peculiar nervous symptoms, digestive disturbances, rapid loss of flesh and decreased milk flow. The blood carries an excess of ketone bodies (aceto-acetic, beta-hydroxybutic acid and acetone) which are eliminated largely through the kidneys.

The disease, while no doubt occurring commonly in cattle in the United States, has apparently escaped the notice of the American veterinarians until recently. Many cases formerly diagnosed as milk fever, "delayed" milk fever, eclampsia, indigestion, pica, post-parturient paresis, and particularly "atypical" milk fever, etc., were no doubt acetonemia or ketosis.

Acetonemia has been studied in Europe and recently in the United States by Sampson, Gunziger and Hayden at the New York State Veterinary College, Cornell University. The writer reported unrecognized cases in this magazine something more than a year ago. (VETERINARY MEDICINE, April, 1933, p. 159). In this report a successful plan of treatment was described.

Excepting the contagious diseases of cattle, acetonemia or ketosis is the most important and frequently occurring trouble with which I have to deal in my practice. I estimate that 75% of the cows I treat between December 1st and June 1st are cases of ketosis. The disease is important from the standpoint, not of death losses, but from the loss in flesh and milk flow of the animals affected.

Etiology

European writers state that the disease occurs mostly in closely-stabled, well-fed, fat cows. This is not true in this section of the South, since here the cattle are never closely stabled and seldom excessively fed. It occurs frequently in the spring and summer when the only feed is grass, and in cows in thin condition, as well as in those better fed. It is soldom seen in the larger dairies where fairly balanced rations are fed the year around. It occurs in poor, fair and good milk cows.

The essential cause is a matter of conjecture. It is generally believed to be due to some disturbance of the carbohydrate-fat metabolism.

Symptoms

Four fairly distinct types of this disease occur: (1) exhibiting chiefly nervous symptoms; (2) exhibiting symptoms of digestive disturbances; (3) a paretic type; and (4) complicated with other diseases.

The symptoms of the nervous type might be described as a sort of bovine eclampsia. The cow may continually go through the motion of grazing on bare as well as grassy plots without the usual fixed purpose of getting grass, or she may persistently lick at her calf or the side of the stall, or any object with which she comes in contact. In other cases she persists in moving around and licking her shoulder. She may carry her head high and look wild, or walk as though blind. In some, the back is arched or it may be swayed or curved sideways, and the animal may walk with stiff legs as if hoppled. In some the flanks are drawn rigid, the cow moving as if straight-laced. At times, only one hind quarter is affected. One hip may be carried higher than the other, with the entire leg stiff. Again, the stiffness may be located in both legs and the loin, and the cow may walk as though she were trying to get her rear parts in front. The eyes, in rare cases, are puffed around the orbits, but generally the eye is prominent and glary. Sometimes the cow will bat her eyes at every movement made at her, as though she feared being struck. Frequently, the cow may be drenched only with difficulty. Sometimes she will fall when drenched if the head is not raised with care.

Although the disease is usually in a milder form, I have seen cases in which it was so severe that the cow would die in convulsions or become paralyzed. Some cows seem to be predisposed to the disease and are affected after each calving.

Another feature of the nervous type of ketosis—the attacks are irregularly remittent. The cow may have an attack one day, lasting from a few hours to all day, and be apparently well the next morning, only to have another attack in the afternoon. Sometimes, in such cases, several days or a week may elapse before another attack. The cow may remain well after one or two attacks, or they may recur irregularly for a week, a month, or longer. Some cases are never entirely well until the disease runs its course, and there is no regularity in the course it may run.

The appetite is usually good, or only slightly impaired in the beginning, but under the stress of repeated attacks or its continuation for any length of time, the digestion becomes impaired and the cow grows weaker, refuses to eat, or eats but little, loses flesh and condition, and the milk flow decreases.

Type exhibiting digestive disturbances—Sjolema describes this type as follows: "The odor of acetone, lack of appetite, growing worse as the disease advances and production of dry feces, decreased milk flow and also fast breath. A small number of animals are in an excited state. The symptoms resemble those of indigestion."

Hutyra and Marek describe this type as follows:

> The animals had first depressed appetite, became rather selective in their food consumption, refusing especially grain and hay, while straw bedding, heath and moldy hay are readily consumed. Accompanying the decreased consumption of hay is the decreased circumference of the abdomen, rapid emaciation, decreased rumination, during which some animals suddenly stop mastication, only to resume it again. Light constipation and straining are also observed. The animals are also easily excited and are continually listening as soon as someone nears their stable. Frequently the animals are in a condition of semi-consciousness, showing depression of the sensorium.

They also call attention to the acetone odor of the breath. This, I think, is sometimes misleading, as in my observation this acetone odor is seldom noticed except in cases of a week or more duration. The milk flow also decreases rapidly. The back may be arched, head down, eyes dull and glaring, tucked up in flank, some are reluctant to move, and wabbly behind. The sight may be impaired and in severe cases I have seen the animal totally blind.

NO DOUBT every practitioner has seen many cases, especially in winter and spring months, of cows that go off their feed and examine them as one will, nothing can be found wrong except that they just won't eat. They mope about the place, pick up old dirty shucks, straw, bedding, etc. I have demonstrated by urine test that many such cases are due to an excess of ketone bodies in the blood. The course of this type of the disease is slow, usually lasting weeks and even months. The cow is never well at any time during the course of the disease.

In man acidosis is an important consideration as a complication in many diseases. Its recognition and treatment as such is of great advantage to the physician in the relief and cure of his patient. Acetonemia likewise, is an important complication in some diseases occuring in veterinary practice and its recognition by the veterinarian no less advantageous to his client.

It has been shown by the test of the urine and blood that some cases of milk fever show an excess of ketones in the blood, i. e., that some cases of milk fever are complicated by acetonemia or *vice versa*. I have had cases of milk fever in which the cow responded to the classical treatment but continued sick and sometimes unable to rise. It is probable that this was due to a complication with ketosis, at least in some of the cases.

We also have ketosis as a complication of metritis and other diseases of an infectious nature, and possibly in cases of indigestion. I have seen one case that exhibited all of the symptoms of the nervous type of ketosis following chloroform anesthesia. Cases heretofore diagnosed as post-parturient paralysis would have proved in many instances to be ketosis if a test of the urine had been made.

Diagnosis

All cases in cows exhibiting nervous symptoms as in in-co-ordination, excitability, peculiar movements, partial or complete paralysis, stupor, lassitude, and those off feed should be suspected of being ketosis unless other causes can be ascribed. Also cases of milk fever and diseases of an infectious nature that do not respond satisfactorily to treatment that is usually successful should be suspected of being complicated by ketosis. The diagnosis is confirmed by a urine test.

Urine Test.—There has been worked out at the New York State Veterinary College a rapid urine test for ketone bodies, which is used in the ambulatory clinic there. I carry a couple of test tubes and the chemicals necessary to make the test in my equipment on calls. In a few minutes the urine may be drawn and tested. Instructions for making the test is given in Udalls' new book, "Practice of Veterinary Medicine," as follows:

The reagents consist of a mixture of one part of finely powdered sodium-nitroprusside with one hundred parts of chemically pure ammonium sulphate, and a separate solution of concentrated ammonium hydroxide. One gram of the nitroprusside-sulphate mixture is dissolved in 5 cc. of the suspected urine, then 2 cc. of the ammonium hydroxide are added and the contents of the tube mixed. A permanganate color develops if acetone bodies are present. The color will grow more intense in the course of two or three minutes. The permanganate color is pronounced even in a moderate acetonemia, but becomes more marked with the severity of the acetonemia.

Treatment

Chloral-hydrate is a specific. Three ounces given orally in the course of 24 hours, in proper doses, is usually sufficient in the nervous type of the disease. In the form of the disease exhibiting prominent digestive symptoms I usually prescribed four or five ounces of chloral hydrate. Before employing this treatment I had practically exhausted the pharmacopoeia in my search for a remedy, but had failed to find anything that would give satisfactory results. I have been using the chloral treatment for five years, practically exclusively in the treatment of this condition and as acetonemia is a very prevalent disease in this section, I have treated many hundreds of cases of the disease in its many and varied forms, with this drug. In every case the cure has been prompt and positive.

The symptoms are always allayed in from two to 48 hours; the urine test is negative in 24 to 48 hours, proving that the chloral has cured the cow. I have drawn the urine and tested it in many cases before and after treatment, and the urine is always negative following the treatment. I prescribe for many cases at my office from the description given by the farmer. They sometimes bring in the urine for the test. Many have learned and just call for the medicine. This treatment I consider is as positive, sure and specific for acetonemia as the air or calcium treatment is for milk fever. It is simple and can be administered by the owner. I am careful to disguise the drug, the advantages of which to the practitioner is apparent. Chloral hydrate is not a drug for lay prescribing. In a few, very severe cases, in valuable cows, I have given in addition intravenous injections of calcium gluconate. This is probably an advantage in some cases, due to the low calcium level of the blood. It is usually, however, not necessary.

Case Reports

Case No. 1.—Jersey cow, three years old with first calf, about 10 days old, was sick three days before I was called. Her head was carried high, eyes bright, prominent and glary, one hip was carried higher than the other, her back was rigid, she walked stiffly with short steps, as if hobbled, appetite impaired and milk flow about half what it should have been; urine, blood and milk samples were taken and sent to Dr. C. E. Hayden, New York State Veterinary College, Cornell. The cow was treated by giving her four doses of six grams each of chloral hydrate, in 24 hours. She was perfectly normal next day. In 72 hours more samples were sent to Dr. Hayden. (See next page.)

The milk gave qualitative indication of a considerable ketone content.

Case No. 2.—Jersey cow six years old, calf one week old. This cow had been sick 48 hours when I was called. She was found standing in lot with head down, ears drooped, in a very stupid condition. Only with diffi-

Laboratory report by Dr. Hayden—Case 1.

Milligrams per 100 cc. of blood

	Sugar	Calcium	T. N. P. N.	Urea N.	Total Ketones
Pre-Treatment	30.67	9.03	29.50	6.30	45.45
Recovery.....	56.82	9.03	31.7	7.60	4.65

Milligrams per 100 cc. of urine.

	Total Ketones	Ammonia
Pre-treatment....	135.10	27.47
Recovery.....	7.77	20.66

culty could she be persuaded to move. She then was weak in hind legs, and advanced all four legs with a dragging motion. She refused all feed, would not notice her calf, and the milk flow was very much decreased. Blood samples were taken, and sent to Dr. C. E. Hayden as before. The cow was treated with chloral hydrate as case No. 1. In 24 hours she was much improved; in 48 hours she was normal, when another blood sample was taken and sent to Dr. Hayden.

Laboratory report by Dr. Hayden—Case 2.

Milligrams per 100 cc.

	Sugar	Calcium	Total Ketones
Pre-Treatment.....	32.2	7.8	30.86
Post-Treatment.....	47.8	9.3	7.35

He says: "The reading for ketone bodies in the urine is about as high as we have met in any case. The low blood sugar and low calcium of the pre-treatment sample are what we would expect in a case of ketosis."

It will be noted in the two cases cited above that after the administration of chloral hydrate the cows were well in 24 to 48 hours respectively, and that the total ketone bodies in the blood was reduced in the first case from 45.45 to 4.65 milligrams per 100cc. of blood and in the second case from 30.86 to 7.35 milligrams.

Case No. 3.—This was a 4-year-old cow suffering from the type of ketosis exhibiting digestive disturbances. The cow had a calf six weeks old. The owner reported that she had not eaten heartily since she calved and had gradually become worse until the past week when she would just mince along with her eating, barely consuming enough to keep her alive. Upon examination I could find nothing especially wrong with her except the impaired appetite, somewhat dry feces, rather gaunt in the abdomen, loss of flesh, dull eye, and reduced milk flow. A dose of chloral hydrate was given and three doses left to be given three times a day. The owner reported on the third day that the cow was eating her feed ravenously and the milk flow had increased nearly one gallon at a milking. I heard from this cow several times within ten days after treatment, the owner saying that the results of the treatment were highly effective.

Case No. 4.—A 6-year-old cow was found down in her stable. Her calf was about ten days old. The owner stated that the cow came up from paddock stiff and staggering, and crumpled down immediately she entered the stable. From the picture presented, I did not believe this to be a case of milk fever but felt certain that it was ketosis. Nevertheless, 250cc calcium gluconate solution was injected, part intravenously and part subcutaneously. I would have left chloral hydrate to be given a few hours later, but happened not to have any in my bag. The cow was reported no better the next day, when the chloral hydrate treatment was prescribed. After the first dose, the cow was up, eating hay within two hours. Then two more doses of chloral were given. Recovery was complete.

Case No. 5.—A 5-year-old cow, fresh ten days when I was called. History of having rapidly fallen away in flesh and milk flow; at first very good appetite, which was gradually lost at the end of a week. I found her emaciated, depressed, off feed, head down, vision impaired, very wabbly in hind legs, suppressed milk flow, temperature normal. Acetonemia was at once suspected. The urine was drawn and tested. It gave

a pronounced ketone reaction. Three ounces of chloral were given within 24 hours, in four equal doses. The cow was much improved in 24 hours. Two more ounces were given on the second day; the third day this cow was normal except for emaciation and decreased milk flow.

Case No. 6.—Five-year-old cow in excellent flesh, did well up until the calf was three weeks old. She gave eighteen quarts of milk daily, when suddenly she began to refuse her feed and fall away in milk flow rapidly, until after a week I was called. Upon a careful examination nothing could be found except emaciation, the milk flow reduced to six quarts, and the absolute refusal to consume her feed. The urine test gave a pronounced reaction. Five ounces of chloral were administered. The urine was negative in 48 hours. Complete recovery.

Case No. 7.—This 8-year-old cow had been sick three weeks. Her calf was four weeks old. She was reduced in flesh to almost a skeleton, milk flow totally suppressed. She was blind; could not be induced to move. She was rigid and drawn and the owner stated she had not eaten or drunk for a week. Within two hours after the first dose of chloral was given she drank and ate a little. Four ounces of chloral were given in 36 hours; she ate heartily in sixteen hours after the first dose. Recovery was rapid. The eyesight gradually returned and was normal in about a week.

Case No. 8.—This, a 6-year-old Jersey cow, with a calf five weeks old, was affected two or more weeks before I was called. None of the nervous symptoms common to the disease were exhibited at any time. Her appetite was impaired but never entirely lost. The milk flow was reduced from over three gallons to less than a gallon a day. There was rapid loss in flesh, dullness, listlessness, somewhat dry feces, weak peristaltic action of rumen and acetone odor of breath, milk and body. Four ounces of chloral hydrate were given and the cow was perfectly normal in 48 hours, when urine gave a negative test.

Case No. 9.—Six-year-old Jersey cow with a calf three weeks old. This cow had been sick two weeks when I was called. She had a history of having her body twisted in various shapes; at times carrying head high and stiff, and uncertain in motion. Sometimes better and sometimes worse. She had gradually lost appetite, rapidly lost flesh and milk flow, getting very much worse during past few days. I found the cow standing very rigidly with head elevated. In a few minutes she began to jerk, became more rigid, plunged through wire fence, fell and had a severe convulsion. In about 20 minutes she staggered to her feet, but soon plunged into objects again and fell once more. This cow was totally blind and in a very bad way. The owner reported the cow had been having fits for several days, getting worse all the time until on the day I was called she was having fits every few minutes. She was given enough chloral to almost anesthetize her, after which she lay quiet. Five ounces of chloral were given in all, in 48 hours. In six hours from the first dose the cow was relaxed and grazing. Recovery was rapid and complete except the eye sight remained impaired for a week or ten days.

Zusammenfassung

Acetonemia, früher atypisches Milchfieber genannt, ist eine in Mississippi von Anfang Dezember bis Ende Mai sich häufig ereignende Krankheit der auf der Weide gehaltenen Milchkühe. Vier verschiedene Formen werden beobachtet: (1) mit vorwiegend nervösen Symptomen, (2) Verdauungsstörungen, (3) Lähmungserscheinungen, (4) als Komplikation mit anderen Krankheiten. Die Diagnose wird auf Grund des Ausfalls der Harnprobe (Ross' Modifikation der Rothera Probe) gestellt. Die Behandlung besteht in der innerlichen Anwendung von 100 Gramm Chloralhydrat in geeigneten Gaben während eines Zeitraumes von 24 Stunden. In den Fällen mit Magen-Darmstörungen kann man bis 150 Gramm Chloralhydrat geben. Die klinischen Symptome verschwinden innerhalb 2 bis 48 Stunden; die Harnprobe wird in 24 bis 48 Sunden negativ.

Streptococcic Contamination of Dairy Barns*

By C. S. BRYAN,
Agricultural Experiment Station,
East Lansing, Michigan.

THE spread of mastitis in dairy herds which goes on irrespective of the apparently careful disinfection of the teats and udder before and after milking, proper disposal of the infected milk, and segregation of infected cows at one end of the milking line, presents an important problem. Such progressive spread of infection among the milking cows indicates or suggests that all the means of spread are not yet fully controlled. Furthermore, there is the noticeable lack of spread of the infection during the summer. This is true in great part because factors predisposing to infection are more numerous during the winter months. The writer is aware of the possibility of the infection spreading during the summer months but not becoming active until the winter months.

It is important to bear in mind that milking cows are usually housed in the barn during the winter, thus crowding is greater; whereas in the summer they are outside except for the brief milking periods. During the summer the cow is more often exposed, and for longer periods, to physical factors inimical to the bacteria that may be found on the animal. Streptococci as a group seem especially susceptible to such physical factors; thus are killed, if present, before they gain entrance into the udder.

During the winter time the cows are housed continuously and conditions are somewhat different. The cows do not change their relative positions; this tends to expose certain cows to more direct possibilities of infection. During the milking a certain amount of milk spatters into the litter; further when cows lie down in the stalls, drops of milk, in some cases containing infective bacteria, escape from the udder. Other factors such as the amount of milk production, type of stall and whether the cow is an easy or hard milker also enter the picture. Seelman[2] reports mastitis experimentally produced in a cow by contaminating the straw with naturally, streptococcus-infected milk. No injuries were apparent on udder or teats, yet the cow developed mastitis. A desire to determine the fate of streptococci of mastitis which under normal conditions in an infected herd find their way into the litter and dust resulted in the work herein reported.

Technique

Milk samples to be examined for the streptococci of mastitis were collected from each cow and cultured according to the technique previously reported by the writer.[1] In brief the technic follows: Samples of milk were collected directly in sterile tubes after the cow's udder, teats, and flank were wiped with a moist cloth; the first two streams from the quarter being discarded. The milk was cultured using liver infusion blood 5% agar in which gentian-violet in final dilution of 1-150,000 was incorporated. The streptococci isolated in these properly collected milk samples were responsible for the mastitis present.

Samples of dust, dirt and straw were also collected from various places in the barn to determine the presence or absence of the streptococci of mastitis. The following technic was employed in collecting these samples.

Cotton swabs were inserted into tubes of physiological salt solution and held above the solution by the cotton plug. These were sterilized at 15 pounds pressure for 30 minutes. When used to collect samples of dust or litter the swab was moistened in the salt solution and then streaked over an area to be cultured. The material obtained was then rinsed off into the salt solution and transported to the laboratory. Similar tubes were

*Journal Article No. 185 (n.s.) from Michigan Agricultural Experiment Station. Received for publication June 2, 1934.

prepared using 2.5% of sodium bi-carbonate instead of the salt solution. If about five hours were allowed to elapse after collecting the sample and before culturing, many of the other bacteria were killed and the streptococci were readily isolated.

Results and Discussion

Infection of the various animals was established by bacteriological and chemical tests; the streptococcus responsible for infection was isolated in each case. Similarly the streptococci present in the samples of dust and bedding were isolated for further study. The initial division of all the streptococci isolated was made according to their reaction when grown on blood agar. In the herds studied alpha, beta and gamma streptococci were encountered. The fermentation reactions were then made and the streptococci identified according to the classification of Holman.[3]

Table 1. Condition of infection found in herd A in 1933 and the streptococci found in the milk of infected cows and in the litter and dust of the barn.

Number of milk cows in the herd.....20
Number of infected cows in the herd..... 4
Number of non-infected cows in the herd.....16

Streptococci found infecting the cows—
Streptococcus agalactiae
Streptococcus mitis
Streptococcus anginosus
Streptococcus salivarius

Streptococci found in litter and dust
Streptococcus mitis
Streptococcus anginosus
Streptococcus salivarius
Streptococcus agalactiae
Streptococcus fecalis

Table 1 presents the data relative to the number of cows of herd A which were infected in 1933. At this time the infected animals were isolated at one end of the milking line, were milked last, the teat cups of the milker were dipped into a strong chlorine solution before the milking of each cow and proper disposal was made of the infected milk.

These measures were applied for one year. At the end of this time owner reported that he felt the condition had not been controlled. Samples were again collected and examined.

Table 2. Condition of infection found in herd A in 1934, one year after the measures of mastitis control had been inaugurated.

Number of milk cows in herd.....20
Number of infected cows in herd.....20
Number of non-infected cows in herd..... 0
Streptococci found infecting the cows
S. agalactiae *S. anginosus*
S. mitis *S. salivarius*
Streptococci found in litter and dust
S. mitis
S. salivarius
S. agalactiae
S. anginosus
S. fecalis

It is noted readily, that during the year when hygienic measures of control were practiced a spread of infection took place. The number of cows examined each year were the same; however, at the 1934 examination, several cows which had gone dry were replaced by some that had freshened. Similar conditions were used to collect the milk samples and the same streptococci were isolated each time; thus the streptococci so isolated was taken as being the cause of the infection present. Rosell and Miller[4] believe that a large number of the streptococci found in milk samples may be contaminants which gain entrance from the environment at the time the sample is collected. Since the same streptococcus was always isolated from each infected cow, the writer believes that the organism found was the cause of the mastitis. It would have been impossible to isolate repeatedly the same organism if outside contamination had been the source.

Table 3. Condition of infection found in herd B, and the streptococci found in the milk of infected cows and in the litter and dust of the barn.

Number of milk cows in the herd.....12
Number of infected cows in the herd..... 6
Number of non-infected cows in the herd.... 6
Streptococci found infecting the cows
S. non-hemolyticus ii
S. mitis
S. agalactiae
Streptococci found in litter and dust
S. non-hemolyticus ii
S. mitis
S. fecalis

Table 3 presents the data obtained in herd B. The picture is similar to that found in herd A. In almost each case the streptococci found infecting the cows were isolated from the bedding or litter. *S. agalactiae* was not recovered from the litter and dust in the barn of herd B. This suggests the possi-

bility that it is less resistant to the physical environment it encountered upon being eliminated from the cow.

The study of the streptococcic contamination of the barn was continued in the early summer. It was immediately noted that when the cows were turned out on pasture, except for the brief milking periods a gradual decrease in numbers of the aforementioned infective streptococci was obtained in the litter and dust of the barn. This decrease was followed by a complete disappearance of such living streptococci; for a short period of time the *S. fecalis* then became predominant. The decrease in numbers of surviving infective streptococci was noted from the time the cows were turned out until a varying period, in different herds, of 20-30 days. This would seem to indicate that while the infected cows are in the barn they act as a continuous source of contamination to the barn.

The same time that isolations of streptococci were made from the litter and dust, similar samples were collected in sterile petri dishes. These samples were transferred to the laboratory and cultured at intervals for the detection of surviving streptococci of mastitis. One group of litter and dust samples was held at room temperature protected from direct sunlight and another group was held at 8°C. in the ice box.

When first cultured, these samples yielded the same infective streptococci as those collected in salt solution at the barn. As the time of holding samples at room temperature was increased, it was found that the living infective streptococci gradually decreased and finally none could be isolated. The length of time from collection until no living infective streptococci could be isolated varied from 20 to 30 days. These samples after collection were of course protected from future contamination and the results agree with those found when the cows are turned out of the barn.

The samples which have been held at ice box temperature (8°C.) were cultured at various intervals. These have been held in the ice box for one year and the infective streptococci can still be isolated. This would seem to indicate that the physical factors determine in great part the period of viability of infective streptococci after they are eliminated from the cow.

The environment of the cow plays a definite part in exposure to the various disease producing bacteria. The length of time of exposure or a suitable opportunity for entry are then only necessary to bring about infection. The method of producing experimental mastitis as originated by Hadley and Frost[5], consisting of twirling a swab of cotton moistened with a culture of streptococcus in the opening of the teat, gives us an idea of how easily the infection may be spread. The experiments reported by Seelman[2] also support this view. Since the cow comes in close contact with the dust, straw, etc., which in turn becomes contaminated from other cows, it is not unreasonable to suppose that infection was spread in this manner. Hygienic measures did help in controlling infectious mastitis, but ample opportunity was present to allow the infection to spread as was indicated in herd A.

Conclusions

Streptococci which were responsible for the infectious mastitis present in the herd were recovered from the dust, litter and bedding in the barn. Such streptococci could not be isolated from the dust, litter and bedding 20 to 30 days after the continuous source of contamination was removed.

Cow stable dust litter and bedding from contaminated barns, held at ice box temperature have yielded the infected streptococci for a period of more than one year. This suggests that physical factors largely determine the time of survival of such infective streptococci in the environment of the infected cow.

Zusammenfassung

Die für die Entstehung der Euterentzündung in der Herde verantwortlichen Streptokokken konnten aus dem Staub, der Einstreu, und dem Miste des Stalles nachgewiesen werden. Zwanzig bis dreissig Tage nach der Beseitigung der Verunreinigungsquelle konnten diese Streptokokken aus dem oben genannten Materiale nicht mehr gezüchtet werden. Wenn jedoch Staub, Ein-

streu und Mist aus solchen verunreinigten Ställen bei Gefriertemperatur aufbewahrt wurden, konnten diese Streptokokken noch über ein Jahr lang gefunden werden. Es wird angenommen dass die Lebensdauer der Streptokokken in der Umgebung einer Kuh durch physikalische Faktoren beeinflusst wird.

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Gastro-Enteritis and Dermatitis in Dogs and Cats Due to Pyrethrum

With the coming of warm weather, insect pests of pets create a large demand for insecticides from pet owners. Possibly due to its price as well as its superior qualities as an insecticide, pyrethrum is found in many of the common household insecticides and in some, specifically recommended to remove lice and fleas from dogs and cats.

The large order of Carduus contains the pyrethrum flower. Commercial pyrethrum is made by drying the flowers of *Chrysanthemum cinerariaefolium* and *Chrysanthemum coccineum*. This product apparently contains two active principles toxic for dogs and cats, (1) the pyrethrum ester, which gives it its insecticidal properties and also produces gastro-enteritis and acute toxic symptoms, and (2) an oleoresin common to many members of the Carduus which in some cases, causes a dermatitis.

About eight years ago we were called on to treat a Chihuahua for repeated attacks of gastro-enteritis that responded promptly to treatment, but recurred in a short time. Finally his owner suggested that the spells might be due to a common brand of household pyrethrum powder used to rid the dog of fleas, stating that she had noticed the dog had these attacks in short order every time she used the powder. The dog was placed under our observation and this proved to be true. No more powders were used and no more attacks occurred. This placed us with valuable knowledge and in any case of gastro-enteritis, the question is always raised when and what kind of an insecticide has been used. Since that time we have been able to relieve many cases that ordinarily would have had further attacks and possibly have held clients that would have resorted to other help or neighborhood advice.

Cases of acute toxemia have been noted from application of pyrethrum powders, but all responded promptly to treatment. Observation of these cases showed that the dogs did not lick themselves, but after the powder was dusted on plentifully, they shook themselves and suddenly developed an acute toxemia. In a case in my own dog, no treatment was instituted and his recovery was rapid.

The cases showing gastric symptoms, all I personally observed, licked themselves. In my own dog, tuba toxin in a base with some pyrethrum, causes the acute toxic condition.

Cases of dermatitis traced directly to the use of pyrethrum powders, responded rapidly after a cleansing bath and no further use of pyrethrum in any form.

The cases reported were an extremely small fraction of those handled in our clinic, but enough to justify this report as a possible aid to other practitioners.

Zusammenfassung

Bei der "Schreck"-Krankheit der Hunde scheint es sich im Grunde um eine Mangelkrankheit zu handeln. Erbliche und umweltliche Umstände spielen dabei eine begünstigende Rolle. Eine Behandlungsweise die auf diesen Erwägungen aufgebaut ist, ist gewöhnlich erfolgversprechend.

J. Gilbert Horning.
Houston, Texas.

Fright Disease in Dogs and Its Treatment*

By S. W. HAIGLER,
St. Louis, Missouri

THERE are about as many different theories as to the cause of fright disease in dogs and as many different opinions as to the proper treatment as there are breeds of dogs.

The terms fright disease, running fits, barking fits, canine hysteria, etc., are descriptive names applied to the condition. I am of the opinion that while the symptoms are similar, there are different kinds of fright fits. This is reflected in the diversity of opinion as to the cause and treatment.

The condition began to attract attention of veterinarians in the United States about 1920. Cases had been reported previously for many years[1], but it was about this time that the disease began to be recognized generally in the southern states and gradually spread northward. It was reported in Great Britain in 1924, and as in America, some report having seen it earlier. From 1920 to 1930, it became general over the United States.

Some believe that fright disease is not in reality a disease, but rather a symptom. English veterinarians term it canine hysteria. In describing the disease, some refer to the epileptiform seizures as being the most pronounced manifestations, while others see the running, barking, hysterical attacks. I have seen many cases that started running and barking and after a few minutes fell into convulsions which persisted until relieved by medication. Others die in convulsions of heart failure. In the hot months of the summer it is common to see cases of heat prostration as a result of running fits.

There is no doubt that excitement brings on an attack. Bird dogs and hounds while on the hunt, and pet dogs when taken for a walk, or ride in an automobile are frequently attacked. Any sudden noise or excitement around the house, such as ringing of the door bell, starting a vacuum cleaner, a passing wagon or lawn mower, fire crackers, etc., may bring on an attack. These and many other things no doubt constitute exciting causes, but as to the basic and predisposing cause or causes, I am not prepared to speak with certainty. From personal observation, I have seen fright fits apparently due to diet, foreign bodies in the stomach or intestines (such as coal, buttons, screws, etc.), intestinal parasites and teething. I am inclined to look upon it as basically a nutritional deficiency with heredity and environment as important predisposing causes and all other conditions we see associated with it—excitement, intestinal parasites, foreign bodies, acute indigestion, etc., as just so many exciting or immediate causes. Treatment based upon this theory is, in large measure, successful as is also prevention and these are the chief concern of the owner of the affected dog.

*Presented at the 43rd annual meeting of the Missouri Veterinary Association, Jefferson City, July, 16-17, 1934.

[1]Tricket of Kansas City, reports having seen typical cases in 1889.

Fright fits are frequently a forerunner of distemper, but whether there is a direct connection, I am not prepared to say. A prominent Mid-West veterinarian told me that he had followed up hundreds of cases of these fits and found 90 per cent develop distemper within two weeks. I have seen cases of distemper following fright fits so often that we always isolate affected puppies when they are left at the hospital. Likewise, I have seen older dogs and those known to have had distemper, have periodic attacks of fright disease.

Nocard, Gray, Milks and others believe that it is caused by ear mites. Nocard has produced the disease experimentally by placing wax from an infected ear into the ear of a normal dog. I have tried to relieve the condition by treating the patient's ear for mites, but to no avail. Also, I have seen numerous dogs the ears of which were teaming with mites, and no history of fright disease. I am inclined to look upon ear mites as just another exciting cause.

Major Chambers of England and others believe that the disease is only a syndrome and not a disease entity, and that the predisposing causes include any condition affecting the nutrition of the brain, such as exhaustion, anemia, malnutrition or any disease of the gastro-intestinal tract, and may be associated with improper feeding, lack of vitamin B, botulism, hookworm, etc.

Dr. Wm. Lintz, a physician, in an article in the August, 1929, issue of VETERINARY MEDICINE calls the condition hyperkinesia. He states that it is a definite disease, not only by exclusion of other diseases, but by reason of the fact that he was able to inoculate healthy dogs with blood from diseased dogs and promptly reproduced the disease. Numerous cultures were made and the most constant findings were a gram negative motile bacillus. From his descriptions of the symptoms and findings in a large kennel, I am inclined to believe that he was dealing with a gastro-intestinal toxemia or distemper. I wrote Doctor Lintz recently to inquire if he had any further information along this line and his answer indicated that he had not.

Wright and his associates reported finding a definite causative agent in 1926, but I am uninformed as to the details of their findings.

I am thoroughly convinced in my own mind that fright disease is a syndrome, and that the causes remote, predisposing and immediate, may be listed as follows, according to their relative importance:

1. Diet. Certain forms of carbohydrates, white bread, dog biscuits, corn meal, etc., which do not constitute an adequate ration for a dog.
2. Heredity, breeding, environment.
3. Indigestion, engorgement of the stomach and foreign bodies.
4. Intestinal parasites.
5. Teething.

The immediate cause is usually some form of excitement which starts the symptoms, similar to a torch applied to a gasoline-soaked rag. The emotional effect of dog shows usually cause numerous cases of fright fits.

Treatment: In as much as the predisposing causes are numerous, so would the treatment vary. Our policy is to try and determine the probable cause and remove it. During extreme excitement, administer a sedative and place the patient in a cool, dark room and keep it as quiet as possible. Most cases will become calm in about twenty minutes. Then by the process of elimination, we try to get at the cause. A laxative is always prescribed, a change of diet recommended, and the feeding limited in amount for several days.

Zusammenfassung

In einer Anzahl von Hunden und Katzen die mit Magen-Darmentzündung und Hautausschlägen zur Behandlung kamen, wurde die mit Magen-Darmentzündung und Haut-Pulver als die auslösende Ursache ermittelt.

The Application of Biochemistry to Veterinary Practice and Research*

By HENRY DRYERRE,
Professor of Physiology, Royal (Dick) Veterinary College; Chief Biochemist, Moredun Research Institute, Animal Diseases Research Association, Edinburgh.

BIOCHEMISTRY is the chemistry of life. Although this science is receiving much prominence today, we can see the empirical application of its principles far back in biblical history. In Genesis the records of the making of wine from grapes, and again in Numbers the reference to the manufacture of vinegar, illustrate the early application of enzymes in producing biochemical changes.

Towards the end of the eighteenth century we see the commencement of biochemistry as a science in the work of Lavoisier and Laplace, who laid the foundations of the modern principles governing dietetics. The lead given by these French scientists was taken up by the Russian, Lomonossov, and more intensively and profitably in Germany by von Liebig, who founded a chemical laboratory at Giessen, which was later transferred to Munich. The synthetic production of urea, by Wöhler in 1828, may be reckoned as one of the milestones of progress in the science of biochemistry. Until that time urea was looked upon as being peculiarly the product of the living animal.

Wöhler's epoch-making discovery, however, opened up a wide avenue of speculation as to how far the chemist could imitate nature in the production of organic compounds. During the succeeding years, with the development of organic chemistry, the materialistic conception of life gradually gained credence in opposition to the vitalistic theory. This engendered a close co-operation between chemistry and physiology, the latter applying the new science towards the elucidation of many of the phenomena of life.

Thus we see the gradual evolution of a special branch of the science which became known as Physiological Chemistry, the first chair of which was established in Strasbourg in 1883. The science, therefore, was at first nourished in the arms of physiology, but, by the process of inevitability, it outgrew the care of its fosterparent and, emerging under the name of biochemistry, continued to grow in importance along a course of its own.

BIOCHEMISTRY deals with the chemical changes which are continually taking place in every living subject, whether that be plant or animal. The object of this paper is to show, by a discussion of general principles and by reference to specific examples, the service which biochemistry can render in the study of diseases of animals.

Every living animal possesses the ability to grow and to produce energy. In order that it may exercise these functions, it must be supplied with the necessary material. This material is food. It was early recognized that the food must be sufficient both in quality and in quantity. Three so-called proximate principles must be present, namely, carbohydrates, proteins and fats, together with inorganic salts and a sufficiency of water. More recently the importance of vitamins has been recognized, and in the drawing up of a dietary, care must be taken to insure that a sufficiency of these is included. This

*Presented at the 52nd Annual Congress of National Veterinary Medical Association of Great Britain and Ireland, July 30th-August 3rd, 1934.

precaution is the more necessary when, in the case of herbivorous animals, these are being fed intensively on concentrates, as contrasted with natural feeding. After the food has been masticated and has passed through the stomach or stomachs of the animal, it eventually reaches the intestines.

It must be realized, however, that even when the food has reached the intestines, it is still outside the animal's body, and before it can be absorbed it must undergo certain changes. These changes are effected by the process of digestion, which is carried through by the action of the enzymes. When the material has been rendered soluble and absorbable, and only then, it passes through the wall of the gut and enters into the blood or the lymph of the animal. It is the business of the biochemist to study in detail the changes which take place in the foodstuffs during digestion, and to follow the processes which occur after these products are absorbed. Some of the products of digestion enter into the constitution of the tissues of the animal, differing in amount and relative proportions in the different species.

With a knowledge of what occurs in the normal animal, the biochemist is in a position to determine the abnormal, and it is his business to ascertain the cause and the means of remedying the defective condition. The study of the chemistry of the tissues was a logical sequence in the investigations which followed, and gradually we find the more academic work giving place to investigations of more direct economic importance.

The knowledge of the composition of foods in terms of proteins, fats and carbohydrates is no longer sufficient when discussing the diets of domestic animals. The nature of these components and, more important still, the amount of these constituents which can be absorbed by the animal, must be known. From this has arisen the chemistry of dietetics which, although it has been applied for many years, is still far from finality.

Gradually it became more and more apparent that the rôle played by the mineral constituents was of an importance equal to if not greater than that for which the organic material was responsible. The animal, as a whole, may be looked upon as an aggregation of countless millions of chemical factories, each contributing its quota to the whole. The factories are bathed in the tissue juices, and their activities are regulated largely by the concentration of the inorganic ions in the latter. The contractions of the heart, the activity of muscle, the permeability of capillaries, the formation of hemoglobin, the building of bone and the secretion of milk, are all manifestations in which mineral metabolism plays an important part. Each and all of these is intimately bound up with the welfare of the animal, and any gross departure from the normal gives rise to symptoms of disease.

THE refinements of modern science have made it possible for the chemist to demonstrate the importance of the infinitely little. This is well exemplified in the part played by copper in the animal economy. An infinitesimal amount of this metal must be present in the food of the animal in order that it may thrive.

Recent work has shown that even if an animal is receiving sufficient iron in its diet, and although the iron may be absorbed and lodged in its tissues, it is unable to convert this iron into hemoglobin unless there be present also an exceedingly small quantity of copper. This provokes the speculation whether there are not in the tissues other minerals, at present unsuspected, which are necessary for the well being, if not for the very existence, of the animal.

The whole organism thus is marvelously balanced and, by the combined effects of absorption, storage and excretion, equilibrium is maintained. Any disturbance in the concentration of one constituent inevitably produces changes in others, and the degree of the disturbance will determine whether there will be any clinical manifestation.

BIOCHEMISTRY then, from small beginnings, has developed into a science with many ramifications and many workers. Not only do we find those who are particularly interested in the academic study of certain branches of the subject, but we also find those who concentrate their energies on its practical application. The services of the chemist are being utilized in widely divergent professions and trades. The large scale manufacturers of dietetic products no longer employ empirical methods in the production of their wares. The various constituents are now carefully analyzed, and the final product is submitted to clinical and biochemical tests before it can be considered satisfactory. The production of cheese on a commercial scale is subject to control by chemists and the brewing of beer is another illustration of applied biochemistry. During the Great War the rationing of the army, and the feeding of the civilians, were directed by the findings of the biochemist. The Royal Air Force, by the application of biophysical and biochemical methods, can determine within the compass of a room, whether or not a candidate for admission can withstand the conditions which obtain in high altitudes.

Biochemistry can be directly applied also to the investigation of animal disease, and the recognition of this fact has recently caused its adoption as an instrument in veterinary research.

As a result of the investigations of biochemists, we find well-conceived schemes for the systematic investigation of the body tissues. These vary in variety from bones to blood, from muscle to endocrine organs, and from hair to body secretions. Is any of this work of use to the veterinary practitioner, and, if so, to what extent? It may be answered that eventually all of it will be useful, but time is the factor which will determine to what degree.

It cannot be denied that the findings of biochemical examinations have outrun their interpretation. A knowledge of the composition of a tissue does not carry one far, unless the function of the tissue be also understood, and the more fully function is studied, the more clearly is there demonstrated the interdependence of one tissue upon another. Perhaps most of all has the study of the biochemistry of the blood led to profitable results in so far as the practitioner is concerned. I shall therefore devote some time to the consideration of this branch of the subject.

Veterinary biochemists have been hampered in their investigation of disease by the lack of reliable data referable to the composition of the bloods of normal domestic animals. This initial difficulty is now being gradually overcome. During the last four years the Biochemical Department of the Animal Diseases Research Association has been accumulating data referable to the normal animal. The results of these analyses have been recorded carefully and collated, and the information yielded by them is being found of increasing value.

THE blood has been aptly termed "the stream of life." It is the *via media* by which, through the help of the lymph, all nourishment is carried to the tissues, and by which all waste products are removed from them. On *prima facie* consideration therefore it might be assumed that a knowledge of the condition of the blood would be indicative of the condition of the fixed tissues. But further consideration will show that there are limitations to this assumption. It must be borne in mind that the blood is a transport system. It is constantly conveying material from one part to another, and at present the biochemist, from an examination of the blood, is able to estimate only the nature and the amount of the constituents in transport at a particular time.

An example will illustrate my meaning. Calcium is present in the blood of certain species in a concentration of the order of 10 milligrams per 100 centimeters of serum. Now, all the calcium in the animal has been derived from outside its body, that is, it has come from its food; also, nearly 100 per cent of the calcium

within the animal is deposited in its bones. The blood is the channel of communication between these two. The animal, moreover, is constantly excreting calcium via the large intestines and the kidneys. If, therefore, an analysis of the blood shows that it has a diminished content of calcium, this may be due to a deficient absorption from the small intestines, an increased deposition in the bones, or an increased excretion from the body. There is nothing in the analysis of the blood *per se* to indicate which factor is the responsible one. Therefore, if a diminished blood calcium should exist, one is not justified in concluding that there is a deficiency of calcium in the animal's body as a whole. Nevertheless, when these limitations are kept in mind much profitable information may be obtained from a chemical examination of the blood. This is illustrated by the following examples.

ONE of the earliest problems presented to the Biochemical Department of the Animal Diseases Research Association was a condition of progressive debility which affected sheep and cattle when grazed on certain areas. Examination of the bloods from affected and non-affected animals showed that the former were deficient in hemoglobin. The extent of the deficiency was roughly proportional to the degree of debility.

The condition bore clinical resemblance to that of Nakuruitis, reported by Orr, and in conjunction with the Rowett Research Institute, controlled field experiments were devised in which the test animals were treated with minerals containing a large percentage of ferric oxide, with satisfactory results. Since the publication of these observations, numerous cases of "wasting," or "pine," have been reported to us by practitioners in widely scattered areas in Scotland and in England. In every case in which our advice has been invited, I have requested specimens of blood to be sent for examination.

It was soon evident that in certain cases there were causes other than deficiency of iron responsible for the condition. By thus having the blood examined chemically, we have been able precisely to indicate to the practitioner which cases would benefit from iron therapy, and this has effected very considerable economic saving.

On the other hand, practitioners have reported considerable losses occurring in stock in which no suspicion of an iron deficiency had been entertained. The empirical administration of minerals and salt licks had proved useless. Examination of the blood showed the existence of a hypoferremia, and the administration of iron compounds was recommended; these elicited a specific curative response, and no further deaths occurred.

In the course of these investigations, blood was received from several cases which eventually proved to be those of Johne's disease, and in each case a marked deficiency of hemoglobin was observed. Such observation is perhaps not unexpected in view of the clinical condition of the animal, but it may be worth recording.

ANOTHER illustration of the usefulness of biochemical methods in elucidating the nature of a diseased condition, and in evolving a rational method of cure, is seen in milk fever. From a study of all the available data relative to this disease, the biochemist and the clinician were enabled to evolve a working hypothesis in explanation of its obscure etiology. The hypothesis was capable of experimental test and, while it has not proved wholly correct, other workers, including the original authors, have shown that it is substantially true in that the immediate cause of the disease is represented by a calcium deficiency in the blood. They subsequently found that the curative action of mammary inflation depended upon its raising the concentration of blood calcium, and were thus able to devise a rational and specific treatment of the condition by means of the injection of suitable calcium salts. In this way, the treatment of milk fever has been restored to the hands of him to whom it properly belongs—the

veterinary practitioner. A similar condition has been shown to exist in lambing sickness, and also in transit tetany of mares. As the result of this biochemical confirmation, the parenteral administration of calcium salts is employed in these conditions, and a rapid recovery can be assured.

A CONDITION in which the chemical examination of the blood has yielded profitable results is exemplified by the so-called lactation tetany. This disease which is usually rapidly fatal, has been shown to be invariably accompanied by a deficiency of magnesium in the blood. Occasionally, the blood calcium may also be below normal. From the known physiological effect of magnesium, it was deduced that this deficiency could account for the symptoms, and this suggested the adoption of magnesium therapy, Experience has shown that the injection of a soluble salt of magnesium with or without the addition of a calcium compound effects a cure, and this is now the routine treatment. Reports received show that recovery may be expected in every case in which this therapeutic measure is timeously adopted.

SO FAR, I have dealt with those conditions where an examination of the blood yielded information which led subsequently to a rational and successful method of treatment. There are, however, several diseases in which a chemical examination of the tissues, although showing characteristic changes, has so far failed to elicit the exact nature of the disease, and has failed to indicate a specific cure. This is seen particularly in grass sickness in horses. Examination of a very large number of blood specimens shows that in every acute case of this disease the condition is essentially one of anhydremia.

The dehydration in grass sickness has proceeded to so marked a degree, and the viscosity of the blood is so much increased, that I am convinced that this is a potent factor in causing the ultimate death of the animal, because of an inability to maintain the cerebral circulation. After examining serial specimens collected from affected animals, I am of the opinion, however, that this condition of the blood is secondary, and is not the primary cause of the disease.

In view of the fact that micturition and defecation are both arrested, the disappearance of the water from the blood called for further investigation. No edema of the tissues occurs, but, as is well known, the stomach in this condition is distended with fluid, and the quantity present is sufficient to account for that which has disappeared from the blood.

A deficiency of sodium chloride also exists in the blood in these cases, and this can be accounted for by the increased amount of this salt present in the gastric contents. This suggested palliative treatment by the intravenous infusion of large quantities of saline solution, and whilst in some cases it proved of promise, in no case was a cure effected.

SCRAPIE is another condition which has been approached from a chemical standpoint, and although some interesting points have evolved, the etiology of the disease still remains unsolved. It was soon apparent from the examination of the blood that the glucose content varied within wide limits. In the earlier cases examined there was a certain degree of correlation between the blood sugar and the clinical condition of the animal. The sugar concentration was high in the primary stages, and tended to fall as the disease progressed, but throughout the course of the disease it evinced marked variation. Examination of the pancreas did not yield an explanation. This suggested that the sugar changes were secondary to some other factor, and led to a determination of the glycogen content of the liver and muscle.

It was found that in those cases in which the blood sugar was low, the glycogen reserves were almost depleted. Since, however, carbohydrate disturbance was one of the most marked biochemical features,

and since the pancreas, as has been said, appeared normal, one was led to an examination of the thyroid and adrenal glands. In almost every case these were found to be hypertrophied, but, although these findings constituted perhaps the most significant gross lesions yet found in this disease, their actual interpretation is still to be determined.

ENZOOTIC abortion in sheep is a condition of great economic importance and one which presents certain biochemical features. The disease, as it affects Scotland, is peculiarly localized in its incidence. On some farms the ewes may become affected, no matter on what part they are grazed. On others they are liable to abort only when they are herded on certain areas.

An examination of the blood from some of these affected animals showed a low content of inorganic phosphorus. In view of the work of Theiler, who showed that aphosphorosis in cattle may be accompanied by abortion, it was decided to test the effect which the feeding of phosphates exerted upon the abortion rate. Accordingly, a controlled experiment was set up in which the test sheep were given a diet rich in phosphorus. This had the desired effect of raising the phosphate content of the blood relative to the controls, but it had no effect in reducing the abortion rate. Subsequently, the administration of vitamins was tried, and the initial experiment which was set up last year produced results of promise.

During the past lambing season the vitamins A, D and E, alone and in combination, have been tried on a larger scale, but the results whilst satisfactory in some areas, have proved disappointing in others. From the localization of the incidence of this condition, there is strong presumptive evidence that it is due to a deficiency or, alternatively, to a deleterious factor in the soil and/or pasture.

IN THUS reviewing the results of some of the problems submitted to us, it is proper that I should refer to our failures as well as to our successes. It may be that in carrying through these investigations and in putting our findings on record we may prevent others from traversing the same paths. Alternatively, it may lead to these experiments being repeated by others with greater prospects of success. The element of doubt is a powerful stimulant, and, as Duclaux expressed it, "It is because science is sure of nothing that it is always advancing."

As biochemistry develops in its relation to veterinary practice, the question arises as to who shall fulfill the more important rôle—the laboratory worker or the general practitioner. There need be no doubt about the answer: the general practitioner will always be the dominating factor in the diagnosis and treatment of disease. But it may be said, with some degree of confidence, that the more general application of biochemical methods as aids to diagnosis will place the practice of veterinary medicine on a firmer basis, which should be no longer empirical.

I HAVE chosen to deal with this subject in a general way rather than to particularize. I have done so because I wish to stimulate the interest of the vast body of general practitioners in the possibilities of the application of biochemical methods to their work. I have touched only on the fringe of the subject, and, indeed, there is an enormous ground yet to be explored. As already indicated, much of the time in our laboratories has been occupied in the routine examination of bloods from presumably healthy animals, with a view to gaining knowledge regarding physiological standards. By doing so, we are placed in a position to interpret the finding from pathological specimens.

Much, however, has yet to be done on the chemistry of the urines of domestic animals. The knowledge to be derived from the analyses of blood and urine specimens obtained simultaneously from the same animal is of much more value than is represented by their additive value. Practical difficulties, however, deter the

use of this technique as a routine procedure. The laboratory worker will be dependent largely on the cooperation of the practitioner if any progress is to be made. Their relationship should be clear.

When help is required in diagnosis it is the work of the biochemist to make his examination and report to the practitioner in terms relative to the normal standard. It is the work of the practitioner to interpret these findings and apply them in the case of his patient. It thus becomes apparent that for profitable results the laboratory worker should be a biochemist first, with a basic knowledge of the clinical syndromes, and the practitioner should be a clinician first, with an appreciation of the possibilities of biochemistry.

I have not touched on the academic biochemical research work that is being done in the domains of veterinary science as opposed to applied biochemistry in veterinary practice. Here the science of biochemistry is being more and more intensively applied. The specialized breeding of the cow for maximum milk production has stimulated fresh work on the chemistry of the secretion of milk, and the relationship of the constituents of the diet to yield. Knowledge of the chemical factors regulating the production and control of estrus is rapidly approaching solution; and the chemistry of immunology is now becoming recognized as an important development of the science.

IN considering the achievements of applied biochemistry in recent years, one feels a measure of confidence in believing that these will be continued and extended in the future, and one is tempted to conclude with these stimulating, if somewhat optimistic, words of Thorpe:

"In the not far distant future the whole subject of biochemistry, which is the chemistry of life, will form but a part of organic chemistry, and we shall be able to apply to it the means and methods which have been attended with such astounding success during the past sixty years in the treatment of the parent science. When this is the case, the causes of our bodily ills will be as clear as the structure of indigo, and their removal as easy as a test-tube reaction."

Zusammenfassung

Biochemie ist die Lehre von den chemischen Vorgängen im Gewebe des lebenden Körpers. Die Kenntnis der normalen Vorgänge bildet die Grundlage zur Erkenntnis des Abnormalen, zur Erforschung seiner Ursachen, und der Wege zur Wiederherstellung. Die Tätigkeit der Zellen wird hauptsächlich durch die Konzentration des inorganischen Ionengehaltes reguliert. Jede Zelle steht in einem Wechselverhältnis zur Nachbarzelle; die Gesamtsumme der Zelltätigkeiten ergibt den Grad der Gesundheit eines Tieres. Jede ausgeprägte Abweichung von den normalen Vorgängen drückt sich in Krankheitserscheinungen aus. Der Körper wird durch die Zusammenwirkung der Absorption, der Aufspeicherung, und der Ausscheidung im Gleichgewicht gehalten. Eine Konzentrationsänderung eines Bestandteiles hat Störung im anderen Teile zur Folge; von dem Grade dieser Störung hängt das Auftreten wahrnehmbarer Symptome ab. Die Biochemie kann beim Studium der Krankheiten vertvolle Dienste leisten; im besonderen kann uns die Blutchemie wichtige Aufschlüsse geben. Wir wissen dass ein Tier das genug verdauungsfähiges Eisen bekommt, dieses doch nicht in Blutfarbstoff umwandeln kann, es sei denn dass eine gewisse Menge Kupfer zugegen ist. Auf Grund des Blutbefundes bei der Untersuchung einer Schafkrankheit in verschiedenen Teilen Schottlands und Englands konnte eine erfolgreiche Eisentherapie aufgebaut werden. Es ist bekannt, dass ein Kalziummangel das ursächliche Moment des Milchfiebers ist. Ein Magnesiummangel wurde als die Ursache der Laktationstetanie ermittelt. Bei anderen Krankheiten (Graskrankheit, Skrapie) konnte die Biochemie jedoch keine befriedigenden Erfolge aufweisen. Bei einem enzootischen Abortus der Schafe konnte ein inorganischer Phosphormangel festgestellt werden, aber die darauf aufgebaute Phosphortherapie war erfolglos.

Do You Remember?

1, Question. What are the glands of internal secretion, and which of these also have external secretions?

A. The structures commonly classed as glands of internal secretion (ductless glands) only are: the adrenals or suprarenal, paraganglia, parathyroid, pineal or epiphysis cerebri, pituitary or hypophysis cerebri, placenta, spleen, thymus and thyroid glands. Structures which have both internal and external secretions (discharged through ducts) are: the gonads, intestine, liver and stomach, and the mammary, pancreas and prostate glands.

2, Q. What are the chief properties of hormones?

A. The chief properties of hormones are: (a) heating does not destroy them; (b) they are dializable, or capable of passing through membranes; (c) they do not form antibodies; (d) some act quite rapidly, others very slowly; (e) their action is the same on all animals; (f) and some, possibly all hormones, are chemicals which may be artificially (synthetically) prepared.

3, Q. What are the chief functions of the adrenal, pituitary and thyroid glands?

A. a. The chief functions of the adrenal glands are to: (1) control of secondary sexual characteristics; (2) control of the emotions; (3) stimulation of the sympathetic system; (4) decrease bacterial infection; (5) raise the blood pressure; (6) influence the sugar content of the blood; (7) check bleeding; and (8) prevent Addison's disease.

b. The chief functions of the pituitary gland are: (1) primarily growth and metabolism; the secretions from this gland also influence (2) blood pressure, (3) peristalsis, (4) secretion of milk, (5) amount of urine, (6) the contractions of the uterine muscles, and (7) the color of frogs and some reptiles.

c. The chief functions of the thyroid gland are: (1) controls development and growth by regulating basal metabolism; (2) production of necessary iodine compounds; (3) prevents the formation of some toxins; (4) aids in the formation of antitoxins; and (5) establishes immunity to some diseases.

4, Q. What causes acromegaly? cretinism? dwarfism? exophthalmic goitre?

A. Acromegaly is caused by a hypersecretion of the anterior lobe of the pituitary gland; cretins by a hyposecretion of the thyroid gland; dwarfs by a hyposecretion of the pituitary gland; and exophthalmic goitre by a hypersecretion of the thyroid gland.

5, Q. The "tetany syndrome" is seen after the removal of what glands?

A. The removal of the parathyroid glands causes tetany and convulsions which together are known as the tetany syndrome.

6, Q. What is a chalone?

A. A chalone or colyone is a substance which is carried by the blood to various organs upon which it exerts an inhibiting function of various degrees.

7, Q. Does the functioning of one ductless gland have any effect upon the functioning of other glands?

A. Probably no ductless gland has a purely independent action. Each gland has its own particular functions to perform, but normally a complex balance exists between the different glands which may be destroyed by the abnormal functioning of any single unit of the endocrine system.

Wesley O. Keefer.

Akron, Ohio.

Health of Animals

Animal raising is largely a matter of animal health and animal health can only be maintained through the operations of a good veterinary service in the research laboratories, the colleges, and the field. The sooner this soaks into the head of agriculture, the sooner it will wake up from its present dream of keeping the whole program of disease control in the political circle. Somehow agriculture never seems to have the faculty of preventing anything. It drifts into catastrophe through incompetent leadership and then howls for relief.—*Haver-Glover Messenger.*

Undiagnosed Ailment of Sheep Yields to Calcium

On the morning of May 21st, I was called about 6 o'clock to see some sheep at pasture. The date is immaterial except to give an idea as to the forage they may have been getting. From the description and history I suspected hemorrhagic septicemia. The owner reported having lost lambs, pigs, turkeys and chickens at irregular intervals all spring.

Arriving at the farm, I found three sick ewes. No. 1 was reeling and staggering as she walked, sometimes falling but able to get up, with difficulty. Nos. 2 and 3 were lying flat on their bellies with heads and necks extended and chins resting on the ground, bloated and unable to rise. Their diet for the past month had consisted of well water and blue grass. They were fat and thrifty.

The day previous, which happened to be Sunday, they had been turned into a lot containing a large pond, the dam and surrounding area of which were covered with a rank growth of weeds and grass common to this section of northwest Missouri. The lot contained no vegetation out of the ordinary, so far as I could find. They were turned into the lot about 8:00 a. m. and out on the blue grass about 4:00 p. m. and into the corral at 7:00 p. m., where the lambs were being creep-fed but the ewes received no grain. All appeared normal at the time. The next morning they were found in the condition already described.

As to treatment, we first, merely as a precaution, vaccinated the entire flock of 66 ewes and lambs, using hemorrhagic septicemia bacterin. We then gave ewe No. 1 25 cc. and ewes Nos. 2 and 3 30 cc. each calcium chloride solution (15%) in the jugular vein.

About 6 o'clock that afternoon I was called again and told another ewe was down. I went out and found Nos. 1 and 2 out grazing, No. 3 still down but considerably better and trying to get up. I gave her 40 cc. more calcium chloride solution. No. 4, the new case, was out in the pasture, lying on her side, bloated like a balloon and had the appearance of a cow about dead from milk fever. I gave her about 15 cc. calcium chloride solution. I intended giving more, but she gave a flounce that jerked my needle out of the jugular and before I could reinsert it she staggered to her feet and went staggering and stumbling away. In a short time she was grazing with the rest of the flock as if nothing had happened.

A storm was beginning. I left and told the owner to give each of them a teacup full of epsom salts as soon as the storm was over, which he did, and reported they passed a lot of slime and mucus with their feces the following day. All made a complete recovery.

Note that No. 3 required 70 cc. of the calcium solution and No. 4, in apparently worse condition, got only 15 cc., and both recovered. I don't know any system of figuring the exact dose required.

E. E. Hufft.

Liberty, Mo.

CALCIUM GLUCONATE STARTS PERISTALSIS IN A MARE

I was called about 6:00 a. m. to see a saddle-bred mare six years old with a colt two weeks old at her side. She had been worked to a cultivator the day before, which was about all the work she had done this season. She was worked about seven hours, had sweat freely most of the day, was fed and watered at noon, ate her feed of corn and oats. At 5:00 p. m. she showed colic and was brought to the barn. She was about 16 miles from me and had been treated most of the night by a nearby practitioner. No improvement was visible. I found her slightly bloated, pawing some, sweating over about half her body, nostrils distended, respiration about 60 per minute. No sound whatever of the intestinal movement could be detected on auscultation. She looked like it was all over but the burying.

I tapped her cecum and administered

via the jugular 250 cc. calcium gluconate solution (30%). No other treatment whatever was given. In a few minutes borborygmi could be heard 10 feet from her; the respiration decreased in frequency and a little later she walked to the water tank and drink like a normal horse; in short, went on to recovery in a short time considering what she had been through.

E. E. Hufft.

Liberty, Mo.

Forty Shotes Die; Cause Not Determined

I was called to see a herd of 85 forty-pound shotes and obtained the following history:

These shotes had been running in a fresh oat field for about two weeks. The oats were quite green but there were practically no weeds of any description in the feed. The pigs were all well the day before at noon but in the evening five were unable to stand. They showed marked trembling, went down rather quickly and one died. This dead shote was brought to my hospital for autopsy at once. The following were the findings:

Numerous ascarids, liver enlarged, showing spots and blotches; fine petechia in the kidneys; some gelatinous fluid in the perirenal tissue.

On visiting this herd, the following symptoms were noted: About one-half of the remaining 80 shotes were down. Their temperature ranged from 99 to 100 deg. F. The affected shotes would eat and drink; had a bright look in the eye, their grunt was practically normal. While I was at the farm several died. After the shotes went down there was a diminished respiration and ultimately breathing ceased; the pigs died quietly.

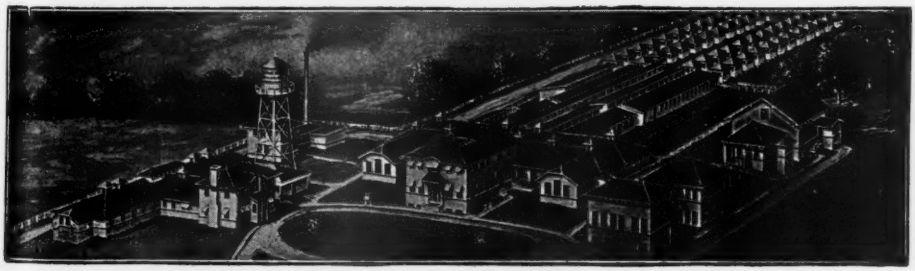
A tentative diagnosis of poisoning was made since such a large percentage of the hogs became affected at once. There was a subnormal temperature, thus eliminating infection. What was the condition and what caused it?—C. L. W., Iowa.

Reply: From the history given, it seems probable that the tentative diagnosis of poisoning was correct. The specific nature of the poisoning is not so easily determined. It has been observed that vegetation developed under unusual climatic conditions may become injurious or poisonous. The season of 1934 has been erratic and there may have been something in the oats that were probably dwarfed that is responsible for the condition.

The history and lesions are not in accord with cocklebur poisoning, and since this happened after the middle of June, the chances are that there were practically no small cockleburs in this field. The description does not coincide with night shade poisoning, and as a matter of fact, it is too early in the season for this trouble to be evidenced.

We believe that it would be good treatment to eliminate by use of a purgative or laxative, such as Glauber's salts.

Should any readers of VETERINARY MEDICINE have had experience with a similar malady, same will be published for the benefit of the readers should it be submitted.—A. T. K.



Buildings on a Biological Farm.

Stubborn Nutritional Ailment

Some difficulty has been encountered in controlling a condition that has occurred in 15 head of cattle on one farm. The following history may be of interest:

In 1933 one of the cows on this farm showed marked evidence of pica. She would eat wood and lick foreign objects. Some time after the pica developed, all four hoofs sloughed. Ultimately the animal recovered. This same cow again began to show similar symptoms a short time ago and the remaining 14 head are now evidencing pica. These cows are on an 80-acre pasture and have access to timothy, blue grass, pigeon grass, sweet clover and Sudan grass. The first cows in the lot of 14 evidenced lameness as an initial symptom. One delivered a healthy, full term calf, but it died soon. These cattle have been given bone meal for the past three or four weeks, without any apparent benefit.

Previously, cattle on this farm similarly affected made a complete recovery when provided with bone meal. The pica is becoming aggravated. The animals will tear boards off the cribs and chew them. Am quite certain this is a deficiency disease and would be glad to know what the deficiency is, and some means of correcting it.—L. B. D., Minn.

Reply: Your report is quite interesting. The malady is without doubt some nutritional disorder, probably a deficiency. Deficiencies are usually exaggerated during dry or erratic seasons and it is assumed there has been some dry weather in your community the past season.

Deficiency of phosphorous, calcium, probably iron and sodium are relatively common. These deficiencies are usually manifested by an abnormal appetite or pica, lameness, enlargement and deformity of bones. The affected animals are unthrifty and soon become more or less emaciated.

The sloughing of hoofs in the one cow mentioned may have been due to ergotism and possibly has no connection with the present malady. It is noted that these cattle have had bone meal for the last three or four weeks. It usually requires rather a long time to correct such deficiencies, and it is suggested that the administration of bone meal be continued and it might be an advantage to also provide some available form of iron and see to it that the animals have an ample amount of salt.—A. T. K.

Simple Operation for Collapsed Trachea

In the July issue of VETERINARY MEDICINE (page 291), a description is given of an operation for a collapsed trachea in a mule. I tried this operation shortly after Guard first described it. It is rather tedious but quite successful. The operation for this condition which I have since used seems equally effective and is far more quickly performed, as illustrated by the following case.

May 22nd, I was called to see a mare that was "choking down" as the owner described it. She was breathing very hard and was down when I arrived. Thinking possibly she was one of those "bulls" or bad roarers on which I have had occasion to go wrong before and operate on, I performed tracheotomy at the usual place and on investigation discovered that the lower half of the trachea was collapsed.

This case was quite a way out into the country and I was scarcely prepared for a condition of which I had no intimation when I left the office; however, the owner had some rubber hose, of the right size. I cut off a piece about 30 inches long, split the upper end and put a string in it, which was tied around the animal's neck. I rounded the lower end, forced it down through the collapsed trachea, divided the muscle, then cut all the collapsed cartilege rings about half way through.

This mare made a splendid recovery.

Each day the owner took out the hose and cleansed it,

This seems to me a simple procedure and one easy to perform. I have had such splendid results with it that I believe the information is worth passing along. Once in a while, a few feet of hose and some binder twine or a bailing wire comes in handy. There was no time to diagnose this case before performing tracheotomy. The animal was *in extremis;* it was a case of give her air immediately or it would be too late.

T. A. Sigler.

Greencastle, Ind.

Allergy Due to Milk in the Diet

How a wholesome food may behave like a veritable poison has recently been illustrated in the usual surprising manner by a young walrus, one of the few in captivity, in the pools of the Zoological Society of San Diego, California. The animal, a female, was captured at an early age on the ice floes of Bering Sea and was fed with meticulous care on evaporated cow's milk, according to the best practices in human infant feeding.

Presently, a considerable variety of pathological features manifested themselves. They included skin disorders (reminding one of the eczematous manifestations of allergy in childhood), disturbances of the mucous membranes, and alimentary dysfunction. Vasomotor rhinits and gastrointestinal disorders, as well as cutaneous symptoms, are, of course, familiar evidences of atopy in which milk is involved. In the case of the baby walrus, despite the failure of all attempts to change the physical environment and care of the animal, immediate relief was experienced when milk was completely eliminated from the diet. Such dramatic results should fortify the efforts to relieve some of the most tantalizing manifestations of discomfort in man.—*Jour. A. M. A.,* 102:9.

Iodine Supplement Not Generally Indicated

In a recent issue on Functional Sterility in Animals, I note on page 345 (V. M., Sept., 1933), on iodine in animal rations, the statement that iodine increased the average daily gain approximately 10 per cent and decreased the food requirement 10 per cent. This conclusion of Evvard's is a misrepresentation of the value of iodine when measured by gain and food consumption under conditions under which the work was performed. I refer you to articles in the *Journal of Agricultural Research:* Vol. 41, Nos. 1 and 2.

Iodine is valuable for swine in sections deficient in the element, but feeding potassium iodide to swine will not increase the gains as stated.

T. B. Keith.

State College, Pa.

General Pruritus in Calves Results from Ring Worm Treatment

On June 4, 1934, I was called to Lawrence, Kansas, in consultation with Dr. T. J. Leasure, to investigate a dermatitis that affected six Hereford calves on the Jenny Wren Farm.

About May 7th, the herdsman had applied mercury ointment to five calves affected with ringworm. On May 10th one of the ringworm calves was noted to have a marked pruritus and on close inspection several small vesicles were noted on areas adjacent to the ringworm lesion, where the ointment had been applied. Later, similar vesicles appeared on the venter surface and especially involved the teats, scrotum and extended up to the anus. Six head became so affected; one showed lesions on the eye lid, another showed lesions around coronary band.

On all the lesions were the same and appeared similar to the lesions of moist eczema. Treatment, bland oil and Fowler's solution.—A. T. K.

Abstracts

By F. VOLKMAR,
Columbus, Ohio

Diagnosis of Pregnancy

Cows. — Fifty head of cattle[66] were used in the experiment. No ovarian hormones could be demonstrated up to the end of the 16th week of gestation. From the 17th to the 22nd week, ovarial hormones could be demonstrated occasionally. Beginning with the 22nd week, ovarian hormones could be demonstrated in the urine regularly. The excretion of ovarian hormones in the urine ceases 24 hours after parturition. Hypophysis-anterior-lobe hormone could not be demonstrated. The excretion of ovarian hormones in the 22nd week varied between 800 and 1,600 mouse-units for each liter of urine; during the 5th month the excretion fell below 800 mouse-units. Enrichment of the ovarian hormone could not be accomplished, nor could detoxication be achieved by means of ether-treatment of the urine. These experiments indicate that the hormonal pregnancy test in cattle is impractical for the diagnosis of gravidity.

Mares.—The urine of pregnant mares[67] contains small amounts of prolan, but beginning with the 120th day, large amounts of folliculin are excreted. The demonstration of folliculin at so late a stage does not play a rôle in the diagnosis of gravidity. Examining the blood of pregnant mares, the author was able to demonstrate prolan in the serum from the 42nd day to the 120th day, by means of the Aschheim-Zondek reaction. Thus, the examination of the blood-serum between the 42nd and the 120th day will enable one to diagnose pregnancy with the aid of the A.-Z. reaction. With the decrease of the prolan content, the amount of the folliculin in the urine will increase.

Pregnancy in the mare can now be recognized with a fair degree of accuracy as early as the 40th day[68]. Up to the 150th day of gestation the most reliable results are obtained when the blood is used. When the gestation has exceeded 150 days, the urine is to be preferred. In either case the amount necessary for the test is 50cc.

Sows. — Pregnant sows[69] excrete temporarily considerable amounts of ovarian hormone in the urine from the 23rd to the 30th day of gestation. From the 5th to the 11th week the excretion of hormone ceases. During the 11th week of gestation the excretion rises gradually to 4,000 and more mouse-units. In some cases folliculin was found in large quantities in the urine 14 days after parturition. Ovarian hormone was never found in the blood-serum; neither was hypophysis-anterior-lobe hormone found in the blood or urine. Consequently, it is not practical to attempt to diagnose pregnancy in sows by means of the demonstration of ovarian hormones.

Ewes. — The authors[70] were unable to demonstrate either ovarial, or hypophysis anterior lobe hormone in sheep, either by the Allan-Doisy test or with the hypophysis anterior lobe reaction I-III. The examinations were made with the blood and urine of sheep from the

[66]Bruhn, W. 1933. Hormonal pregnancy test in cattle. (Transl. title.) Thesis. Hanover. (Abstr. *Jahresber. Vet.-Med.* 54(7/8):378.

[67]Glud, Petersen-Bjerggaard, P., and Portmann, K. 1933. The pregnancy test in the mare. (Transl. title.) Maanedsskr. f. Dyrl. 44:609. (Abstr. *Jahresber. Vet.-Med.* 54:378.)

[68]Küst. 1933. Richtlinien zur Durchführung der hormonalen Trächtigkeitsfestellung der Stute. (The hormonal pregnancy test in the mare.) *Tierarztl. Rundschau* 39:841-842.

[69]Küst and Struck. M. 1934. Untersuchungen über die Sexualhormonausscheidung im Harn und im Blute tragender Sauen. (The excretion of sexual hormone in the urine and blood of pregnant sows.) *Deutsche Tierärztl. Wchnschr.* 42:54-56.

[70]Küst and Vogt. 1934. Versuche über die Möglichkeit der Trächtigkeitsfestatellung beim Schafe durch den Nachweis von Geschlechtshormonen im Harn und Blute. (Hormonal pregnancy test in sheep.) *Deutsche Tierärztl. Wchnschr.* 42(16):241-243.

38th day of pregnancy until the 3rd day after parturition; infantile mice were used for the test. It is therefore assumed that the sheep either possesses no ovarial or hypophysis anterior lobe hormone at all in the blood or urine, or the hormone is present in such small amounts that it cannot be demonstrated with the present methods.

Hereditary Paresis in Rabbits

Ordinarily, this disease[55] seizes the mature rabbit. Beginning marks of syringomyely can be observed as early as the fifth month. The hips appear sunken; the gait becomes stiff; finally, complete paresis will develop. The investigation into the transmission of the hereditary factor demonstrated that animals of the F_1 generation do not show symptoms of paresis; the syringomyely does not occur until the F_2 generation. This proves that the disease is recessive in character. It is also certain that this character is not transmitted in monomeric hereditary succession.

Induced Estrum

Newer researches[71] have demonstrated that estrum may be induced artificially in mammals through the application of female sexual hormones, or through the follicular hormone. Reasoning from the assumption that disorders of the sexual cycle may have been brought about by a disturbance of the influence of the sexual organs, the authors undertook the present experiments. "Unden" Bayer is a standardised follicle hormone, obtained from the urine of mares; it is put on the market in an olive oil solution to which a trace of anise oil had been added. 1cc of the solution contains 200 mouse-units of the ovarial hormone. The dosage for dogs is about 60 to 100 mouse-units (8 to 15 drops) daily. It is given per os as soon as the first symptom of heat appears, and continued for about 6 to 12 days. With this treatment the estrum is developing more rapidly and more pronounced, so that the bitch often has to be bred earlier than anticipated. On the basis of trials on 30 dogs, the authors recommend "Unden" strongly for cases of weak heat, or irregularities in the course of the estrus cycle.

Rumenotomy in Cows

A modification of Hofmann's technic is recommended.[57] Hooks are used to fix the rumen to the abdominal wall during suturing. Infiltration of the skin, in the region of the stitches, with 35cc of a 0.4% aqueous Rivanol-solution was found to facilitate healing by first intention. An elliptic copper hoop to which a linen sleeve is attached is placed into the opening of the wound, to prevent contamination of the wound edges. The technic is practically the same as that described and recommended by Bardwell and Udall 1927 (*The Cornell Vet.* 17:302-314).

Testicular Therapy for Nymphomania

The author[72] made therapeutical use of dehydrated, powdered sterilized testicle-tissue. In this form the preparation will keep for some length of time without deterioration. From his casuistry of 31 cases of nymphomania in mares and 40 cases of sexual disorders in cows the author concludes that the antagonism between the female and the male sexual glands can be used to therapeutical advantage in the mare as well as in the cow. In a considerably large number of cases the feeding of testicle-tissue resulted in a lessening of the symptoms of nymphomania in mares, rendering the horses fit again for work, and tractable.

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[55] **Nachtsheim, H., 1931. Ueber eine erbliche Nervenkrankheit beim Kaninchen. (Hereditary Syringomyely in rabbits).** ***Zeitschr. f. Pelztier u. Rauchwarenk.*** **3:254-259.**

[71] **Koch, W. and August, H. M. 1934. Hormonale Behandlung der Brunstschwäche der Hündin mit dem Follikelhormon "Unden". (Hormonal treatment to induce estrum.)** ***Tierärztl, Rundschau*** **40(6):89-91.**

[57] **Maurer, L., 1934. Die Magenschnittoperation beim Rind. (Operation for traumatic gastritis in cows.)** ***Arch. Tierheilk.*** **67(3):191-223.**

[72] **Rüegg, J. 1934. Ueber Versuche, den Antagonismus der weiblichen und männlichen Keimdrüsen therapeutisch zu verwerten. (Therapeutical use of testicles.) Schweizer Arch. f. Tierheilk. 76(1):2-12.**

Likewise, excessive sexual desires in cows, provided, ovarial degeneration has not taken place already, can be brought back to normal behavior through the feeding of testicle-tissue. In cases of cystic degeneration this treatment, in addition to local therapy, has given remarkably good results. The dosage for mares is 12 to 14 testicles over a period of 2 to 8 weeks. For cows the dosage can be reduced.

Visualization of Spleen

The dosage of thorotrast[73] for each kgm of body weight is 6.5 gm for dogs and 5gm for cats. The preparation is to be given intravenously in two application. The x-ray exposure is to be made 24 hours after the last injection. Thorotrast is retained in the firmer vicera for a long period of time; in dogs, for instance, for twelve months. The liver yields easier and quicker than the spleen to the exposure, and with a small amount of the contrast medium. The application of thorotrast does not cause damage to the tissues. Caution is indicated when using weak animals.

Identification by Nose Prints

On the basis of experiments on more than 100 dogs[74], the nasal prints of dogs seem to give practical results in the identification of dogs, comparable to those of the dactyloscopy. The histological examination of the nasal pattern demonstrated the lack of glands in this region; other remarkable findings were the branching of the papillae of the corium. Examinations repeated over a considerable space of time proved that the configuration of the furrows and of the prominences of the nasal pattern remain constant, although, individually, they differ. The author recommends the following procedure: The tip of the nose is dried with a soft linen towel which has been moistened in alcohol; then, with another towel, the printing ink is swabbed on it. The imprint is taken with a smooth, but not glistening paper. This method will give reliable imprints, whether the dog is alive or dead, whether anemic, or decomposed, or when the nose has been boiled. The analysis of the imprints follows the sulcus naso-medianus and its ramifications.

Luxation of Patellae in Foals —Osteomalacia

If the luxation is of traumatic origin[75] (probably occurring during birth), then the severing of the M. biceps femoris is indicated. More common is the luxation of the patella occurring in colts between the ages of the 6th and the 8th month. It is probably of an infectious and metastatic nature. Due to the pressure of the swollen joint-capsule upon the patella and the lateral condyle, this condyle becomes inflamed. The resulting osteitis causes a sequestration of a thin, bony disk; later a flattening of the lateral condyle takes place. Gradually a complete luxation develops. Such a luxation is incurable; it has to be prevented by combating the causative serous gonitis. The best remedy seems to be needle-firing. This treatment, however, is unpopular with the farmers. The author had good success by aspirating the serous content of the capsule and by subcutaneous injections of dilute iodine-alcohol, laterally from the patella. Cases of luxation of the patella are observed in 1 to 2 year old horses, in which the causative serous gonitis was probably a sequel to rachitis. In other cases it was found that deficient food was the cause. Such cases have to be treated either by adding antirachitic remedies, or by amelioration of the soil, and, of course, by early treatment of the serous gonitis.

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[73]Müller, W. 1933. The practical application of "Thorotrast" for roentgenological demonstration of the spleen and liver in small animals. (Transl. title.) Thesis, Hanover Abstr. *Jahresbericht Vet.-Med.* 54(7/8):377.

[74]Török, J. 1933. Identification of dogs by means of nasal prints. (Transl. title.) Allatorv. Lapok 56:333-339 (Abstr. *Jahresber. Vet.-Med.* 54:307).

[75]Forssell, G. 1933. Luxation of the patella in colts and in young horses. (Transl. title.) Svensk Vet.-tidskr. 38:190-195. (Abstr., *Jahresber. Vet.-Med.* 54:336.)

MODIFIED MILK

Milk may be modified by heat, dilution, concentration, fermentation and predigestion. The most familiar modification by heat is pasteurization, which partially sterilizes it. Heat damages one of the vitamins of milk (the antiscorbutic vitamin C), but this is of small importance practically, as a deficiency of that vitamin can easily be supplied by common food stuffs.

Dilution improves the digestibility of milk and it may be, its flavor, according to the character of the diluent employed. The dilution may be made with water, cereal preparations, strained fresh fruit juices (especially strained juice of orange, grapefruit, and pineapple), strained decoctions of vegetables (milk soups), and decoctions of tea and coffee.

By concentration evaporated and condensed milk and milk powder are produced. These preparations have the merit of keeping well. They can be restored to fluidity by addition of water.

Fermented milks are among the oldest and most valuable modifications of milk. When milk was first used as an adult food it was found that shortly after removal from the source it turned sour and most of its protein coagulated. As far back as history records we find sour milk a favorite food among the milk eating peoples. It was quite natural and proper that this should be so in view of the fact that souring to a certain extent preserves milk from changes which would otherwise unfit it for food: in the early days of civilization there were no refrigerators. This souring is accomplished by lactic acid-producing organisms which reach the milk casually or are purposely introduced into it. Artificially soured milks have been used from time immemorial by peoples around the Mediterranean Sea and in Asia and southern Russia. The Leben of Egypt and Syria, the Matzoon of Armenia and the Koumyss and Kephir of central Asia and southern Russia and the Yoghourt of Bulgaria are examples of these widely used soured milks. Some of these artificially soured milks, as Koumyss, have undergone alcoholic as well as lactic acid fermentation.

As was suggested above, souring to a certain extent safeguards milk from injurious bacterial activity in the intestines; and also by colonizing the alimentary canal with large numbers of acid-producing bacteria, protects to a certain extent the protein of other food stuffs from putrefaction during the processes of digestion and absorption: the bacteria of putrefaction do not flourish in an acid environment. The protein of soured milk is easily broken up into small flakes, which make it easy to digest. In connection with the use of soured milk as a food it should be noted that its large use by some people who are not accustomed to it, or are unusually susceptible, may produce overcolonization of the alimentary canal with the lactic acid-producing organisms and local irritation from the excessive acid produced.

Predigestion of milk means predigestion of its protein by artificial peptonization and pancreatinization. Predigested milk is useful in invalid feeding.—Edward E. Cornwall, M.D., in *Medical Times*, 62:1.

REGARD FOR DOGS

Seven fatalities and three divorces were caused directly in 1933 by affection of men and women for their dogs, a report released by the Chappel Kennel Foundation revealed.

Three persons—one a ten-year-old girl—were killed in attempts to save pets from various forms of disaster. Two dog-owners killed men for injuring their pets and one man committed suicide because his dog had died.

The report, compiled annually in an effort to trace the effects upon human nature of sentiment for animal pets, showed that three women divorced their husbands because of jealousy over affection given to dogs. A Pittsburgh man took a six-month jail sentence rather than obey a court order to kill his dog.

One man was shot in a quarrel over a dog's pedigree, and a thirteen-year-old boy was killed while crossing a railroad track on a visit to the grave of his dog.

Not all manifestations of this friendship for animals brought tragedy in its wake. An Idaho sheep-raiser provoked laughter when he rented an entire floor of twenty-eight rooms in a Chicago hotel rather than obey an order to confine his dog in one room.

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